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ABSTRACT

The revised Arkansas Educational Technology Plan, of the year 2000, is an updated and more detailed plan that is necessary for providing specific help to all levels of the state educational system. The primary focus of the plan is to enhance instruction for higher student achievement through technology and provide a framework to allow this to occur. The revised plan focuses on K-12 education and requires details on high priority needs and implementation of solutions. The planning committee revised the plan recognizing such factors as: technological progress made over the last several years, increased activities in distance learning, more computers accessing the Internet, increase demand for more bandwidth, and changes in local district and state priorities. Contents include: Introduction; Vision; Mission; Goals; Student Standards for Technology; School Improvement; Local School District Planning; Professional Development; Infrastructure; Funding; and Glossary. Appendices include: State Plan Development Timeline; Committee Membership; Arkansas Department of Education: Information and Technology Section; Arkansas Educational Service Cooperative Technology Coordinators; Arkansas Public School Computer Network; Internet Filtering; Accessibility Issues and Policies for the Visually-Impaired; Status Report on Technology in Arkansas K-12 Schools; Computer in Arkansas Public School Districts Grades K-12; and Contributors to Various Technology Related Efforts. A short list of resources for training and technical assistance for educators is provided. (AEF)

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Arkansas Education Technology Plan

JULY 2000

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Table of Contents

INTRODUCTION 2

VISION 3

MISSION 3

GOALS 4

STUDENT STANDARDS FOR TECHNOLOGY 7

SCHOOL IMPROVEMENT 12

LOCAL SCHOOL DISTRICT PLANNING 14

PROFESSIONAL DEVELOPMENT 17

INFRASTRUCTURE 26

FUNDING 33

GLOSSARY 38

APPENDICES 44

- STATE PLAN DEVELOPMENT TIMELINE 45
- COMMITTEE MEMBERSHIP 46
- ARKANSAS DEPARTMENT OF EDUCATION: INFORMATION AND TECHNOLOGY SECTION 47
- ARKANSAS EDUCATIONAL SERVICE COOPERATIVE TECHNOLOGY COORDINATORS 48
- ARKANSAS PUBLIC SCHOOL COMPUTER NETWORK (APSCN) 48
- INTERNET FILTERING 49
- ACCESSIBILITY ISSUES AND POLICIES FOR THE VISUALLY-IMPAIRED 50
- STATUS REPORT ON TECHNOLOGY IN ARKANSAS K-12 SCHOOLS 51
- COMPUTERS IN ARKANSAS PUBLIC SCHOOL DISTRICTS GRADES K-12 53
- CONTRIBUTORS TO VARIOUS TECHNOLOGY RELATED EFFORTS 54
- REFERENCES 55
  - Resources for Training & Technical Assistance for Educators 56
- CURRENT NEWORK 57
- PLANNED NETWORK 58

INTRODUCTION

The revised Arkansas Educational Technology Plan, of the year 2000, is an updated and more detailed plan that is necessary for providing specific help to all levels of the state educational system. The primary focus of the plan is to enhance instruction for higher student achievement through technology and provide a framework to allow this to occur.

Intended Audience of the Plan

Stakeholders	Expected Uses
• State Board of Education • Director of Education • State Level Policy Makers • Service Providers • Arkansas Higher Education Institutions	• Provide high priority needs • Recommended strategies for solutions • Funding estimates and sources • A Vision for effective technology integration with the state's education system at all levels. • Guide for developing policy/budget
• School District Staff and Other Stakeholders (teachers, administrators, technology coordinators, students, local technology planning committees, support staff, parents, local school board members.	• Used as a guide for developing policy • Assist in pursuing funding opportunities • Designing and implementing network infrastructure • Aligning school improvement to technology integration • Provides essential structures and support for continuous improvement • Provides best practices for integrating technology within the educational system. • State and national initiatives

The original plan was approved and adopted in October 1997. It was developed by the Governor's Task Force on Educational Technology Planning Committee, which represented members from a wide range of state agencies, local districts, and legislative panels. It served the purpose of identifying the broad needs of education technology in Arkansas.

The revised plan focuses on K-12 Education and requires details on high priority needs and implementation of solutions. Therefore, the planning committee is narrowed to include representatives from the Arkansas Department of Education, local school districts, Educational Service Cooperatives, Workforce Education, Higher Education, IMPAC Learning Systems, AETN, Department of Information Systems, and APSCN (see detailed committee member list in Appendices). The committee members are key stakeholders committed to improving education in Arkansas.

The committee revised the plan recognizing such factors as: technological progress made over the last several years, increased activities in distance learning, more computers accessing the Internet, increase demand for more bandwidth, and changes in local district and state priorities. Advancement in educational technology is crucial for maintaining a viable and effective public school system in Arkansas. The plan is the key for our collective K-12 efforts and for developing strategies and obtaining funding for innovative educational improvements.

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VISION

Arkansas learners will have equitable access to learning environments that infuse technology into the teaching and learning process, ultimately producing life-long learners who will succeed socially and economically in a society increasingly dependent on technology and information.

MISSION

The Mission of the Educational Technology Plan is to embrace all aspects of the Arkansas Comprehensive Testing, Assessment, and Accountability Program (ACTAAP) and other Arkansas Department of Education initiatives to achieve established benchmarks for teaching and learning by:

- ***Ensuring student centered technology rich learning environments***
- ***Empowering faculty to use technology as a tool to enhance learning***
- ***Equipping learners to be technology literate and productive in an information driven society***
- ***Engaging in collaboration with educational and community-based technology providers***
- ***Endowing school personnel with immediate access to tools, data and information needed to make decisions, educate, and to learn***

GOALS

Student Standards for Technology

- All students in Arkansas Public Schools will demonstrate proficiency in technology standards.

School Improvement

- Technology will be integrated into all aspects of teaching and learning as defined in the school improvement plan.

Schools meeting this goal will demonstrate the following:

- Increased student achievement (performance)
- Diversity of instructional strategies
- Availability and utilization of diverse technology resources
- Appropriate use of technology interventions is aligned with curriculum
- Availability of qualified local staff to support the technology initiatives
- Utilization of technology planning resources by all school personnel
- Long-term and focused professional development with purpose of meeting school improvement goals
- Delivery of instruction with and through technology
- Technology plans that include instructional technology interventions as included in the district's individual school improvement plans

Local Planning

- Each district will develop a comprehensive technology plan that supports the school improvement plan in each school within the district.

Schools meeting this goal will demonstrate the following:

- Technology initiatives that help the district meet its school improvement goals
- An approved plan that makes districts eligible for state and federal technology funds
- Differentiation among instructional and administrative applications within the plan
- Input and contribution from committed stakeholders in the development of the plan (teachers, support staff, administrators, parents, local business, school board, students, etc.)
- Engage in technology planning that focuses on the integration of information technology in teaching and learning
- Availability of qualified local staff to support the technology plan
- Continuous assessment and revision of the plan

Professional Development

- All Arkansas pre-service and in-service teachers will receive training that will lead to demonstration of proficiency in the International Society for Technology in Education (ISTE) Technology Foundation Standards for All Teachers.

Institutions meeting this goal will demonstrate the following:

Pre-Service

- Teacher preparation programs that include the demonstration of technology competencies as defined by the ISTE Standards
- Faculty in teacher preparation programs that model effective instructional uses of technology integration
- Teacher preparation institutions that provide current hardware, software, and network resources for modeling effective instructional strategies in using technology
- Practicum and mentor experiences that align students with teachers who successfully integrate technology into their instruction

Schools meeting this goal will demonstrate the following:

In-Service

- Professional development experiences of long-term duration that demonstrate successful integration of technology into teaching and learning
- All instructional and administrative staff complete a minimum of six clock hours in Professional Development related to integrating technology into the classroom
- Appropriate staffing that supports the implementation of a technology staff development plan
- Appropriate staff development opportunities for administrators and support staff
- Allocation of at least 20% of the district's technology budget for professional development
- An on-going assessment of staff needs for professional development in technology

Infrastructure

- To have an intelligent Wide Area Network (WAN) that provides Local Area Network (LAN) access for K-12 instructional, curricular, and administrative programming from diverse remote resources over an interoperable platform to provide for a resource rich learning environment for any-age learners, anytime, anywhere.

Schools meeting this goal will demonstrate the following:

- Course content resources that include information available through the world-wide-web, multimedia enhanced course software, and from remote interactive sources
- Integrated with and stimulated by business, government, and community partnerships
- LAN connectivity that permits transfer of unit level student and fiscal data from the classroom to the building administrative level, and then to the district central office
- WAN connectivity that permits transfer of student, personnel, and fiscal data from the district central office to the department of education
- Connectivity to all schools within the community, district and/or buildings on the campus
- Sharing of information within the district by allowing access to servers at various instructional and administrative sites in the district
- Properly planned and installed network, that conforms to technical standards established by appropriate standards bodies
- Adequate technical support at the local level

State agency meeting this goal will demonstrate the following:

- All schools will be connected to the state's high-speed telecommunications backbone system, which integrate the school, community, and home through information networks
- Open system that accommodates voice, audio, video, and data using Internet protocol
- A comprehensive Distance Education Network that will enable learners to be able to reach beyond the limits of geography and time to expand opportunities for learning and make the educational process more interactive
- Adequate technical support

Funding

- Adequate funding will be provided to assure that all public school students and personnel will have access to and develop proficiency in the use of technology in the teaching/learning process.

Schools meeting this goal will demonstrate the following:

- Technology initiatives/plans identified by the school improvement plan are budgeted and adequately funded
- Multiple funding options for technology initiatives are evident (example: e-rate, capital improvement, state/federal grants, local millage dedicated to technology, etc.)
- A minimum of 20% of the technology expenditure is dedicated to professional development
- The budget provides for continual assessment and up-grading of equipment

State agency meeting this goal will demonstrate the following:

- Adequate funding is provided for all students to have equitable access to technology resources.
- Adequate funding for the state's data information network and infrastructure.
- Provide resources for schools to implement "best practices" technology initiatives

STUDENT STANDARDS FOR TECHNOLOGY

Goal: *All students in Arkansas Public Schools will demonstrate proficiency in technology standards.*

Introduction

State and local educational technology planning should be driven by what students should know and be able to do. Student competencies such as those established by the International Society for Technology in Education (ISTE) have become a model accepted by practitioners across the country. Standards developed by ISTE are known as the National Educational Technology Standards (NETS). These standards delineate specific and meaningful benchmarks for quality educational experiences for all children. The standards are conceptual and flexible and may be addressed by various instructional strategies through the use of many types of resources. They will remain valuable over time despite the accelerating pace of technological innovations and the challenges of educational reform.

A logical and appropriate extension of the adoption of the NETS Standards by the State Technology Planning Committee is the correlation of these standards to the Arkansas Curriculum Frameworks. Practitioners in each of the content areas should correlate the technology standards to state curriculum standards and provide examples of specific instructional activities that reflect best practices. It is also expected that local school districts will provide opportunities for integrated activities and will offer required and elective courses that will prepare their graduates to succeed at the highest levels. It is also assumed that state regulations must be crafted, adopted, and enforced if all students in our state are to share equally in the possibilities set forth in the Arkansas Educational Technology Plan.

The technology foundation standards for students are divided into six broad categories. Standards within each category are to be introduced, reinforced, and mastered by students. These categories provide a framework for linking performance indicators found within the *Profiles for Technology Literate Students*[1] to the standards. Teachers can use these standards and profiles as guidelines for planning technology-based activities in which students achieve success in learning, communication, and life skills

[1] National Educational Technology Standards for Students: Connecting Curriculum and Technology (ISTE). To order phone: 800-336-5191 ($26.95 cost to members; $29.95 non-members).

Technology Foundation Standards for Students

1. **Basic Operations and Concepts**
   - *Students demonstrate a sound understanding of the nature and operation of technology systems*
   - *Students are proficient in the use of technology.*

2. **Social, Ethical, and Human Issues**
   - *Students understand the ethical, cultural, and societal issues related to technology.*
   - *Students practice responsible use of technology systems, information, and software.*
   - *Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity*

3. **Technology Productivity Tools**
   - *Students use technology tools to enhance learning, increase productivity, and promote creativity.*
   - *Students use productivity tools to collaborate in constructing technology-enhanced models preparing publications, and producing other creative works.*

4. **Technology Communications Tools**
   - *Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.*
   - *Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.*

5. **Technology Research Tools**
   - *Students use technology to locate, evaluate, and collect information from a variety of sources.*
   - *Students use technology tools to process data and report results.*
   - *Students evaluate and select new information resources and technological innovations based on the appropriateness to specific tasks.*

6. **Technology Problem-Solving and Decision-Making Tools**
   - *Students use technology resources for solving problems and making informed decisions.*
   - *Students employ technology in the development of strategies for solving problems in the real world.*

Profile for Technology Literate Students

Introduction

The following student competencies are identified by grade-level groupings to outline expectations for what students at each level should know and be able to do. Users of these lists should be aware that emphasis should be given to integration of these skills into the total instructional program rather than attempt to teach these as isolated, discrete skills.

Student Technology Standards

Numbers in parentheses following each performance indicator refer to the standards category to which the performance is linked. The categories are:

1. Basic operations and concepts
2. Social, ethical, and human issues
3. Technology productivity tools
4. Technology communications tools
5. Technology research tools
6. Technology problem-solving and decision-making tools

Grades K – 12

Prior to completion of Grade 2 students will:

1. Use input devices (e.g., mouse, keyboard, remote control) and output devices (e.g., monitor, printer) to successfully operate computers, VCRs, audiotapes, and other technologies. (1)
2. Use a variety of media and technology resources for directed and independent learning activities. (1,3)
3. Communicate about technology using developmentally appropriate and accurate terminology. (1)
4. Use developmentally appropriate multimedia resources (e.g., interactive books, educational software, elementary multimedia encyclopedias) to support learning. (1)
5. Work cooperatively and collaboratively with peers, family members, and others when using technology in the classroom. (2)
6. Demonstrate positive social and ethical behaviors when using technology. (2)
7. Practice responsible use of technology systems and software. (2)
8. Create developmentally appropriate multimedia products with support from teachers, family members, or student partners. (3)
9. User technology resources (e.g., puzzles, logical thinking programs, writing tools, digital cameras, drawing tools) for problem solving communication, and illustration of thoughts, ideas, and stories. (3,4,5,6)
10. Gather information and communicate with others using telecommunications, with support from teachers, family members, or student partners. (4)

Grades 3 – 5

Prior to completion of Grade 5 students will:

1. Use keyboards and other common input and output devices (including adaptive devices when necessary) efficiently and effectively. (1)
2. Discuss common uses of technology in daily life and the advantages and disadvantages those uses provide. (1,2)

3. Discuss basic issues related to responsible use of technology and information and describe personal consequences of inappropriate use. (2)

4. Use general purpose productivity tools and peripherals to support personal productivity, remediate skill deficits, and facilitate learning throughout the curriculum. (3)

5. Use technology tools (e.g., multimedia authoring, presentation, Web tools, digital cameras, scanners) for individual and collaborative writing, communication, and publishing activities to create knowledge products for audiences inside and outside the classroom. (3,4)

6. Use telecommunications efficiently and effectively to access remote information, communicate with others in support of direct and independent learning, and pursue personal interest. (4)

7. Use telecommunications and online resources (e.g., e-mail, online discussions, Web environments) to participate in collaborative problem-solving activities for the purpose of developing solutions or products for audiences inside and outside the classroom. (4,5,)

8. Use technology resources (e.g., calculators, data collection probes, videos, educational software) for problem-solving, self-directed learning, and extended learning activities. (5,6)

9. Determine when technology is useful and select the appropriate tool(s) and technology resources to address a variety of tasks and problems. (5,6)

10. Evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources. (6)

Student Technology Standards

Numbers in parentheses following each performance indicator refer to the standards category to which the performance is linked. The categories are:

1. Basic operations and concepts
2. Social, ethical, and human issues
3. Technology productivity tools
4. Technology communications tools
5. Technology research tools
6. Technology problem-solving and decision-making tools

Grades 6 – 8

Prior to completion of Grade 8 students will:

1. Apply strategies for identifying and solving routine hardware and software problems that occur during everyday use. (1)

2. Demonstrate knowledge of current changes in information technologies and the effect those changes have on the workplace and society. (2)

3. Exhibit legal and ethical behaviors when using information and technology, and discuss consequences of misuse. (2)

4. Use content-specific tools, software and simulations (e.g., environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research.

5. Apply productivity/multimedia tools and peripherals to support personal productivity, group collaboration, and learning throughout the curriculum. (3,6)

6. Design, develop, publish, and present products (e.g., Web pages, videotapes) using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom. (4,5,6)

7. Collaborate with peers, experts, and others using telecommunications and collaborative tools to investigate curriculum-related problems, issues, and

information and to develop solutions or products for audiences inside and outside the classroom. (4,5)

8. Select and use appropriate tools and technology resources to accomplish a variety of tasks and solve problems. (5,6)

9. Demonstrate an understanding of concepts underlying hardware, software, and connectivity, and of practical applications to learning and problem solving. (1,6)

10. Research and evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources concerning real-world problems. (2,5,6)

Student Technology Standards

Numbers in parentheses following each performance indicator refer to the standards category to which the performance is linked. The categories are:

1. Basic operations and concepts
2. Social, ethical, and human issues
3. Technology productivity tools
4. Technology communications tools
5. Technology research tools
6. Technology problem-solving and decision-making tools

Grades 9 – 12

Prior to completion of Grade 12 students will:

1. Identify capabilities and limitations of contemporary and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning, and workplace needs. (2)

2. Make informed choices among technology systems, resources, and services. (1,2)

3. Analyze advantages and disadvantages of widespread use and reliance on technology in the workplace and in society as a whole. (2)

4. Demonstrate and advocate for legal and ethical behaviors among peers, family, and community regarding the use of technology and information. (2)

5. Use technology tools and resources for managing and communicating personal/professional information (e.g., finances, schedules, addresses, purchases, correspondence). (3,4)

6. Evaluate technology-based options, including distance and distributed education, for lifelong learning. (5)

7. Routinely and efficiently use online information resources to meet needs for collaboration, research, publications, communications, and productivity. (4,5,6)

8. Select and apply technology tools for research, information analysis, problem-solving, and decision-making in content learning. (4,5)

9. Investigate and apply expert systems, intelligent agents, and simulations in real-world situation. (3,5,6)

10. Collaborate with peers, experts, and others to contribute to a content-related knowledge base by using technology to compile, synthesize, produce, and disseminate information, models, and other creative works. (4,5,6)

SCHOOL IMPROVEMENT

Goal: *Technology will be integrated into all aspects of teaching and learning as defined in the school improvement plan.*

Schools meeting this goal will demonstrate the following:

- Increased student achievement (performance)
- Diversity of instructional strategies
- Availability and utilization of diverse technology resources
- Appropriate use of technology interventions is aligned with curriculum
- Availability of qualified local staff to support the technology initiatives
- Utilization of technology planning resources by all school personnel
- Long-term and focused professional development with purpose of meeting school improvement goals
- Delivery of instruction with and through technology
- Technology plans that include instructional technology interventions as included in the district's individual school improvement plans.

The Arkansas Comprehensive Testing, Assessment and Accountability Program (ACTAAP) is an intensive effort toward establishing standards for student performance and achievement. Through ACTAAP, curriculum frameworks that define what students should know and be able to do have been established, a statewide assessment system based on the frameworks has been implemented, and school districts have developed local improvement plans aimed at helping all students achieve high standards.

As part of the state's accreditation process, each school is required to engage in the development and implementation of a consolidated school improvement plan based on priorities indicated by student assessment and other pertinent data. Districts are encouraged to consolidate all their planning efforts into a single, comprehensive plan. This consolidated plan is designed to ensure that all students demonstrate proficiency on all portions of the state-mandated criterion referenced exam. The initial step in the planning model is a structured process that leads to disaggregation of student achievement and other student data. The study of this data helps schools identify areas within the curriculum where student performance does not meet expectation.

Schools prioritize the needs areas, then develop performance-based benchmarks that can be tracked during the implementation phase of the plan. Schools then identify intervention and remediation strategies that, if effectively implemented, will move students toward meeting the established benchmarks. Finally, schools develop an action plan that assigns tasks, identifies resources (including source of funds), and projects evaluation strategies that will signal movement toward meeting the performance standards. The process requires that the intervention and remediation be research-based and linked to proven practices.

The Arkansas Consolidated School Improvement Planning (ACSIP) Model, serves as the umbrella for all major planning initiatives related to standards-based improvement. The model has technology as a major focus area. Technology is an important tool and strategy used by Arkansas schools to help implement their school improvement goals. It has a tremendous effect when implemented in a planned, coordinated manner.

Rather than overburden schools with multiple planning documents, ADE has emphasized a consolidated school improvement planning process, of which instructional technology is an important aspect. The Arkansas Consolidated School Improvement Plan (ACSIP) focuses school resources toward increasing student achievement as measured by criterion-referenced tests. Therefore, instructional technology resources should focus on this same priority.

The instructional technology component of the ACSIP provides an important component of a district's overall technology plan. When schools are developing improvement plans, technology will be included as an intervention tool where appropriate. This will allow for effective technology integration in schools.

LOCAL SCHOOL DISTRICT PLANNING

Goal: *Each District will develop a comprehensive technology plan that supports the school improvement plan from each school within the district.*

Schools meeting this goal will demonstrate the following:

- Technology initiatives that help the district meet its school improvement goals
- An approved plan that makes districts eligible for state and federal technology funds
- Differentiation among instructional and administrative applications within the plan
- Input and contribution from committed stakeholders in the development of the plan (teachers, support staff, administrators, parents, local business, school board, students, etc.)
- Engage in technology planning that focuses on the integration of information technology in teaching and learning
- Availability of qualified local staff to support the technology plan
- Continuous assessment and revision of the plan

Act 999 of 1999 states that each school shall develop a comprehensive, long-range school improvement plan focused on student achievement. The improvement plan shall assist those students performing below grade level to achieve the expected standard. Local school districts must have a comprehensive, long-range, district wide technology plan for implementing educational technology initiatives that support the school improvement plan. The district technology plan will be closely associated with the school improvement plan.

The following factors indicate the need for a comprehensive plan:

- Compatibility required for access to communications networks (local, state, national, international)
- Level of expertise required for efficient and effective planning and implementation and support.
- Cost of hardware and software (compatibility and volume purchasing)
- State and federal requirements (E-rate, grants)

The first step in developing a district plan is to examine the individual comprehensive improvement plans of the schools in the district and identify ways in which technology can be utilized to achieve the goals set forth in these plans. For example, if a school has set a goal of improving student achievement in mathematics in the area of problem solving, instructional strategies using calculators and/or computers and software that can assist in this effort can be identified. If improving written communication skills is a goal, corresponding with e-pals can be an excellent activity. After all of the individual school improvement plans have been analyzed and correlated with technology interventions, these solutions can be summarized and will become part of the district plan. Technology is one intervention utilized to help meet the goals defined by the school improvement plan. Other interventions would include alignment, parental engagement, professional development, evaluation, equity and collaboration.

Another component of the district plan must address the need to prepare students for post-secondary experiences. Future success in academics or in the workplace is increasingly dependent upon being comfortable and competent in the use of technology. Resources to insure that students are well prepared will become a vital piece of the district plan. This may include a curriculum strand for technology, which is composed of student expectations embedded in any/all of the traditional

disciplines, as well as technology-specific courses. A district must address which courses will be required and how the district will assess student proficiency in technology.

In order for students to be aware of technology and to be encouraged and guided in utilizing technology in the pursuit of knowledge, teachers must be adequately prepared. Professional development will be a critical part of the district technology plan. Professional development, is a coordinated set of planned, research-based best practice, learning activities for teachers and administrators, which are standards-based and continuous. The professional development plan will help in developing and sustaining the technology skills of educators, which will enhance teaching, learning, management, and leadership in the education community.

Because teaching and learning must be supported and facilitated by efficient and cost-effective management, appropriate technology that supports school administration must also be provided. Applications in the area of finance, student accounting, and communication within the district, as well as between schools and the community, will require careful planning. Staff development for support personnel must be addressed.

In order for instructional staff and support services to utilize technology effectively and efficiently, the district must have access to competent and timely technical support. The district plan will include a strategy for the installation and maintenance of hardware, software and networking.

Analyzing the requisites of an integrated K-12 technology program that supports the total school program will lead to the writing of a district technology plan which will include but not be restricted to the following components:

- Vision and Mission Statements
- Goals
- Inventory of Existing Programs and Technologies by School Campus
- Curriculum and Instruction (School improvement plans are the basis for this component)
- Staff Development
- Infrastructure
- Action Plans (including timeline and implementation schedule)
- Hardware and Software Purchases
- Technical Support
- Inventory Tracking
- Technology Budget
- Acceptable Use Policies
- Monitoring and Evaluation

A valuable resource for school district technology planning is available at http://arkedu.state.ar.us/ade-guide/. It is strongly recommended that districts visit this site for more detailed explanations and examples. The Arkansas K-12 School District's Electronic School District Technology Planning Guide was written by a State Technology Planning Committee appointed by the Director of the Arkansas Department of Education. The committee, composed of a group of recognized leaders in educational technology in Arkansas, was established November 4, 1998, and the planning guide was put on the ADE website August 15, 1999. The guide will be reviewed and updated as new information and input from users becomes available.

School districts will be required to submit updated district technology plans to the Arkansas Department of Education by December of 2000. Thereafter, school districts' performance in the area of technology will be monitored on a regular schedule that will be integrated into the Statewide Information System and the Arkansas Comprehensive School Improvement Process. Statistical data concerning the quantity and quality of technology within the districts will be gathered annually and

reported electronically through SIS. The appropriate use of technology and its impact on student achievement will be reviewed by the visiting ACSIP teams.

District plans should be reviewed annually at the local level. Following the review by the district technology committee, a report to the superintendent will help to insure that the district plan is monitored adequately, that the parties responsible for implementing the plan are held accountable, and that the plan is kept current and viable. Amendments to the district plan resulting from the annual review will provide an important part of the formal revision of the plan, which should occur on a regular schedule that coincides with the school improvement self-study.

"Teachers are being asked to learn new methods of teaching, while at the same time they are facing even greater challenges of rapidly increasing technological changes and greater diversity in the classroom... (given such challenges) relatively few teachers (20%) report feeling well prepared to integrate educational technology into classroom instruction."

U.S. Department of Education, National Center for Education Statistics. Teacher Quality: A Report on the Preparation and Qualifications of Public School Teachers, January 1999

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PROFESSIONAL DEVELOPMENT

Goal: *All Arkansas in-service and pre-service teachers will receive training that will lead to demonstration of proficiency in the International Society for Technology in Education (ISTE) Technology Foundation Standards for All Teachers.*

Institutions meeting this goal will demonstrate the following:

Pre-Service

- Teacher preparation programs that include the demonstration of technology competencies as defined by the ISTE Standards
- Faculty in teacher preparation programs that model effective instructional uses of technology integration
- Teacher preparation institutions that provide current hardware, software, and network resources for modeling effective instructional strategies in using technology
- Practicum and mentor experiences that align students with teachers who successfully integrate technology into their instruction

Schools meeting this goal will demonstrate the following:

In-Service

- Professional development experiences of long-term duration that demonstrate successful integration of technology into teaching and learning
- All instructional and administrative staff complete a minimum of six clock hours in Professional Development related to integrating technology into the classroom
- Appropriate staffing that supports the implementation of a technology staff development plan
- Appropriate staff development opportunities for administrators and support staff
- Allocation of at least 20% of the district's technology budget for professional development
- An on-going assessment of staff needs for professional development in technology

Introduction

Professional development is central to the success of school reform efforts. Staff development is widely recognized as an essential element contributing to successful implementation of technology programs. Rich technology resources in themselves will not result in increased student learning if teachers do not have the skills necessary to utilize the technology resources in the process of learning. Teachers need to be better prepared to integrate technology meaningfully into their teaching and learning activities. They must adopt efforts where technology is one intervention used to improve classroom teaching and learning.

According to recent state and national surveys, teachers are not receiving the on going in-service and support necessary to upgrade their technological skills. In 1999, the National Center for Educational

Statistics reported that only 1 in 5 teachers felt adequately prepared to integrate technology into their classroom teaching. Therefore, it is crucial that the state and local districts provide for continual professional development to help prepare teachers for their changing roles in a technological environment. In addition to teachers, staff development should also include those that influence student learning (school board, administrators, support staff, parents, or other school stakeholders).

Funding

Typically, districts spend far less on teacher training than on hardware, software, or support. Ongoing financial support must be provided for the sustained delivery of quality professional development in technology use. An annual allocation for professional development is required to make this happen. It is recommended that districts allocate at least 20 percent of technology resources for professional development. The allocation should also include funds for providing opportunities, incentives, rewards, and support for educators to develop model practices using technology.

Best Practices

Many times training is too focused on the mechanics and functionality of technologies. This type of training is sometimes referred to as "one shot" instruction. To use technology effectively for learning, teachers need more than mechanical training on how to operate equipment and software. A new model for staff development allows educators to see actual methods used in classrooms, try out new techniques and get feedback on their efforts, and observe their peers. This model of staff training focuses on effective strategies to integrate technology into the curriculum, as well as the teaching and learning process. For this to occur school personnel need hands on learning, time to experiment, easy access to equipment and availability of support personnel who can help them be effective users of technology.

The International Society for Technology in Education, National Council for Accreditation of Teacher Education, National Staff Development Council, and Consortium for Policy Research in Education all have developed characteristics of effective professional development that are philosophically close. Each of these models requires that each individual be responsible for his/her own professional growth. It also requires that institutions at all levels change the way they approach professional development.

Equity of Access to Technology

In order for Arkansas teachers to overcome barriers that impede the technology professional development process, they must have access to technology tools required to support curriculum, instruction, and assessment. These tools include not only access to professional development opportunities, but personal access to the necessary hardware and software.

A variety of opportunities for technology professional development exist, but those opportunities are not always easily accessible or available to all teachers. The majority of Arkansas teachers still function at the novice level. To remedy this situation Arkansas teachers must be provided with the tools they need – both the physical tools and a diversity of training opportunities. Teachers work at home as well as at school, and they become much more comfortable with technology when they have access both during the school day and at home.

The following are recommended technology professional development tools that should made accessible for each Arkansas teacher:

- Laptop computers
- Presentation devices

- Online access at the classroom level
- Training capacity at the building level that is learner-centered and has participant input
- Peer or mentor support
- Interactive on-line access to state curriculum
- Access to web-based and/or CD-ROM-based training opportunities
- Access to state-of-the-art training center at the district or service cooperative level
- Access to innovative technology professional development opportunities at the district and cooperative level

Higher Education

The Milken Exchange on Education Technology commissioned the International Society for Technology in Education (ISTE) to survey schools, colleges, and departments of education in the U.S. on how they were preparing new teachers to use information technology in their instructional strategies. The report (1998) summarized that teacher preparation programs do not provide new teachers with the types of experiences necessary to prepare them to use technology effectively in their classrooms. With the projected need for 2.2 million new teachers over the next decade, it is imperative that we begin to appraise and bring up to date our teacher preparation programs.

All Arkansas teacher preparation institutes will integrate information technology applications into their curriculum to assure that new teachers have the knowledge and skills described in this plan. Higher Education faculty should expand their technology skills so they can model effective instructional use of technology integration. In order for this to occur, Arkansas teacher preparation institutes must provide for education requirements for faculty in technology use for teaching and learning. In addition, teacher preparation institutions will begin assigning student teachers with qualified teachers and supervisors who can advise them on effective models of integrating technology into the learning process. The Department will collaborate with teacher preparation institutions to help infuse the effective use of technology integration into teacher pre-service programs.

Teacher Technology Standards

Student competencies have previously been identified and are listed in this plan. For students to acquire these skills, they must have teachers who understand how to integrate those technologies into the curriculum. These student competencies drive what knowledge and skills teachers and administrators must possess. The ISTE Educational Technology Foundations Standards for All Teachers reflect professional studies in education providing fundamental concepts, knowledge, skills, and attitudes for applying information technology in educational settings. New teachers will need to meet these educational technology standards and it is the responsibility of Arkansas teacher preparation programs to provide opportunities for their candidates to meet these standards.

National Educational Technology Standards and Performance Indicators for Teachers

Standards	Performance Indicators
I **Educational Operations and Concepts:** Teachers demonstrate a sound understanding of technology operations and concepts. Teachers: **A.** demonstrate knowledge, skills, and understanding of concepts related to introductory technology (as described in ISTE's Technology Standards for Students). **B.** demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies. **II** **Planning and Designing Learning Environments and Experiences:** Teachers plan and design effective learning environments and experiences supported by technology. Teachers: **A.** design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners. **B.** apply current research on teaching and learning with technology when planning learning environments and experiences. **C.** identify and locate technology resources and evaluate them for accuracy and suitability. **D.** plan for the management of technology resources within the context of learning activities. **E.** plan strategies to manage student learning in a technology-enhanced environment. **III** **Teaching, Learning, and the Curriculum:** Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning. Teachers: **A.** facilitate technology-enhanced experiences that address content standards and student technology standards. **B.** use technology to support learner-centered strategies that address the diverse needs of students. **C.** apply technology to develop students' higher order skills and creativity. **D.** manage student learning activities in a technology-enhanced environment. **IV** **Assessment and Evaluation:** Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies. Teachers: **A.** apply technology in assessing student learning of subject matter using a variety of assessment techniques.	**Currently Practicing Arkansas Teachers:** 1. assess the availability of technology resources at the school site, plan activities that integrate available resources, and develop a method for obtaining the additional necessary software and hardware to support the specific learning needs of students in the classroom. (I, II, IV) 2. make appropriate choices about technology systems, resources, and services that are aligned with district and state standards. (I, II) 3. arrange equitable access to appropriate technology resources that enable students to engage successfully in learning activities across subject/content areas and grade levels. (II, III, VI) 4. engage in ongoing planning of lesson sequences that effectively integrate technology resources and are consistent with current best practices for integrating the learning of subject matter and student technology standards (as defined by ISTE's National Educational Technology Standards for Students). (II, III) 5. plan and implement technology-based learning activities that promote student engagement in analysis, synthesis, interpretation, and creation of original products. (II, III) 6. plan for, implement, and evaluate the management of student use of technology resources as part of classroom operations and in specialized instructional situations. (I, II, III, IV) 7. implement a variety of instructional technology strategies and grouping strategies (e.g., whole group, collaborative, individualized, and learner-centered) that include appropriate embedded assessment for meeting the diverse needs of learners. (III, IV) 8. facilitate student access to school and community resources that provide technological and discipline-specific expertise. (III) 9. teach students methods and strategies to assess the validity and reliability of information gathered through technological means. (II, IV) 10. recognize students' talents in the use of technology and provide them with opportunities to share their expertise with their teachers, peers, and others. (II, III, V) 11. guide students in applying self- and peer-assessment tools to critique student-created technology products and the process used to create those products. (IV) **Currently Practicing Arkansas Teachers: (continued)** 12. facilitate students' use of technology that addresses their social needs and cultural identity and promotes their interaction with the global community. (III, VI) 13. use results from assessment measures (e.g., learner profiles, computer-based testing, electronic portfolios) to improve instructional planning, management, and implementation of learning

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B. use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.

C. apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity.

V

Productivity and Professional Practice:

Teachers use technology to enhance their productivity and professional practice. Teachers:

A. use technology resources to engage in ongoing professional development and lifelong learning.

B. continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.

C. apply technology to increase productivity.

D. use technology to communicate and collaborate with peers, parents, and the larger community in order to nurture student learning.

VI

Social, Ethical, Legal, and Human Issues:

Teachers understand the social, ethical, legal, and human issues surrounding the use of technology in K-12 schools and apply that understanding in practice. Teachers:

A. model and teach legal and ethical practice related to technology use.

B. apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.

C. identify and use technology resources that affirm diversity.

D. promote safe and healthy use of technology resources.

E. facilitate equitable access to technology resources for all students.

strategies. (II, IV)

14. use technology tools to collect, analyze interpret, represent, and communicate data (student performance and other information) for the purposes of instructional planning and school improvement. (IV)
15. use technology resources to facilitate communications with parents or guardians of students. (V)
16. identify capabilities and limitations of current and emerging technology resources and assess the potential of these systems and services to address personal, lifelong learning, and workplace needs. (I, IV, V)
17. participate in technology-based collaboration as part of continual and comprehensive professional growth to stay abreast of new and emerging technology resources that support enhanced learning for K-12 students. (V)
18. demonstrate and advocate for legal and ethical behaviors among students, colleagues, and community members regarding the use of technology and information. (V,VI)
19. enforce classroom procedures that guide students' safe and healthy use of technology and that comply with legal and professional responsibilities for students needing assistive technologies. (VI)
20. advocate for equal access to technology for all students in their schools, communities, and homes. (VI)
21. implement procedures consistent with district and school policies that protect the privacy and security of student data and information. (VI)

I **Educational Operations and Concepts:**	**Pre-requisite:** **Skills that are Obtained During Pre-Service Training**
Teachers demonstrate a sound understanding of technology operations and concepts. Teachers:	Prospective teachers:
A. demonstrate knowledge, skills, and understanding of concepts related to introductory technology (as described in ISTE's Technology Standards for Students).	1. demonstrate a sound understanding of the nature and operation of technology systems. (I)* 2. demonstrate proficiency in the use of common input and output devices; solve routine hardware and software problems; and make informed choices about technology systems, resources, and services (I)*
B. demonstrate continual growth in technology knowledge and skills to stay abreast of current and emerging technologies	3. use technology tools and information resources to increase productivity, promote creativity, and facilitate academic learning. (I, III, IV, V) 4. use content-specific tools (e.g., software, simulation, environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research. (I, III, V)*
II **Planning and Designing Learning Environments and Experiences:**	5. use technology resources to facilitate higher order and complex thinking skills, including problem solving, critical thinking, informed decision making, knowledge construction, and creativity. (I, III, V)* 6. collaborate in constructing technology-enhanced models, preparing publications, and producing other creative works using productivity tools. (I, V)*
Teachers plan and design effective learning environments and experiences supported by technology. Teachers:	7. use technology to locate, evaluate, and collect information from a variety of sources. (I, IV,V)* 8. use technology tools to process data and report results. (I, III, IV, V)*
A. design developmentally appropriate learning opportunities that apply technology-enhanced instructional strategies to support the diverse needs of learners.	9. use technology in the development of strategies for solving problems in the real world. (I, III,V)* 10. observe and experience the use of technology in their major field of study (III,V)
B. apply current research on teaching and learning with technology when planning learning environments and experiences.	11. use technology tools and resources for managing and communicating information (e.g., finances, schedules, addresses, purchases, correspondence). (I,V) 12. evaluate and select new information resources and technological innovations based on their appropriateness to specific tasks. (I, III, IV, V)*
C. identify and locate technology resources and evaluate them for accuracy and suitability.	13. use a variety of media and formats, including telecommunications, to collaborate, publish, and interact with peers, experts, and other audiences. (I, V)* 14. demonstrate an understanding of the legal, ethical, cultural, and societal issues related to the diverse needs of students. (II, III, IV, VI)
D. plan for the management of technology resources within the context of learning activities.	15. exhibit positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity. (V, VI)* 16. discuss diversity issues related to electronic media. (I, VI
E. plan strategies to manage student learning in a technology-enhanced environment.	17. discuss the health and safety issues related to technology use. (VI) 18. identify the benefits of technology to maximize student learning and facilitate higher order thinking skills. (I, III) 19. differentiate between appropriate uses of technology for teaching and learning while using electronic resource to design and implement learning activities (II, III, V, VI) 20. identify technology resources available in schools and analyze how accessibility to those resources affects planning for instruction. (I, II)
III **Teaching, Learning, and the Curriculum:**	**Pre-requisite:** **Skills that are Obtained During Pre-Service Training (Continued)**
Teachers implement curriculum plans that include methods and strategies for applying technology to maximize student learning. Teachers:	21. identify, select, and use hardware and software technology resources specially designed for use by PK-12 students to meet specific teaching and learning objectives. (I, II) 22. plan for the management of electronic instructional resources within a lesson design by identifying potential problems and planning for solutions. (II) 23. identify specific technology applications and resources that maximize
A. facilitate technology-enhanced experiences that address content standards and student technology standards.	
B. use technology to support learner-	

centered strategies that address the diverse needs of students.

C. apply technology to develop students' higher order skills and creativity.

D. manage student learning activities in a technology-enhanced environment.

IV
Assessment and Evaluation:

Teachers apply technology to facilitate a variety of effective assessment and evaluation strategies. Teachers:

A. apply technology in assessing student learning of subject matter using a variety of assessment techniques.

B. use technology resources to collect and analyze data, interpret results, and communicate findings to improve instructional practice and maximize student learning.

C. apply multiple methods of evaluation to determine students' appropriate use of technology resources for learning, communication, and productivity.

V
Productivity and Professional Practice:

Teachers use technology to enhance their productivity and professional practice. Teachers:

A. use technology resources to engage in ongoing professional development and lifelong learning.

B. continually evaluate and reflect on professional practice to make informed decisions regarding the use of technology in support of student learning.

C. apply technology to increase productivity.

D. use technology to communicate and collaborate with peers, parents, and the larger community

student learning, address learner needs, and affirm diversity. (III, VI)

24. design and teach technology-enriched learning activities that connect content standards with student technology standards and meet the diverse needs of students. (II, III, IV, VI)
25. design and peer teach a lesson that meets content area standards and reflects the current best practices in teaching and learning with technology. (II, III)
26. plan and teach student-centered learning activities and lessons in which students apply technology tools and resources. (II, III)
27. research and evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information resources to be used by students. (II, IV, V, VI)
28. discuss technology-based assessment and evaluation strategies. (IV)
29. examine multiple strategies for evaluating technology-based student products and the processes used to create those products. (IV)
30. examine technology tools used to collect, analyze, interpret, represent, and communicate student performance data. (I, IV)
31. integrate technology-based assessment strategies and tools into plans for evaluating specific learning activities. (IV)
32. develop a portfolio of technology-based products from coursework, including the related assessment tools. (IV, V)
33. identify and engage in technology-based opportunities for professional education and lifelong learning, including the use of distance education. (V)
34. apply online and other technology resources to support problem solving and related decision making for maximizing student learning. (III,V)
35. participate in online professional collaborations with peers and experts. (III,V)
36. use technology productivity tools to complete required professional tasks. (V)
37. identify technology-related legal and ethical issues, including copyright, privacy, and security of technology systems, data, and information. (VI)
38. examine acceptable use policies for the use of technology in schools, including strategies for addressing threats to security of technology systems, data, and information. (VI)
39. identify issues related to equitable access to technology in school, community, and home environments. (VI)
40. identify safety and health issues related to technology use in schools. (VI)
41. identify and use assistive technologies to meet the special physical needs of students. (VI)
42. apply troubleshooting strategies for solving routine hardware and software problems that occur in the classroom. (I)

Pre-requisite:
Skills that are Obtained During
Pre-Service Training (Continued)

43. identify, evaluate, and select specific technology resources available at the school site and district level to support a coherent lesson sequence. (II, III)
44. design, manage, and facilitate learning experiences using technology that affirm diversity and provide equitable access to resources. (II, VI)
45. create and implement a well-organized plan to manage available technology resources, provide equitable access for all students, and enhance learning outcomes. (II, III)
46. design and facilitate learning experiences that use assistive technologies to meet the special physical needs of students. (II, III)
47. design and teach a coherent sequence of learning activities that integrates appropriate use of technology resources to enhance student academic achievement and technology proficiency by connecting district, state, and national curriculum standards with student technology standards (as defined by ISTE's National Educational Technology Standards for

in order to nurture student learning.

VI
Social, Ethical, Legal, and Human Issues:

Teachers understand the social, ethical, legal, and human issues surrounding the use of technology in K-12 schools and apply that understanding in practice. Teachers:

A. model and teach legal and ethical practice related to technology use.

B. apply technology resources to enable and empower learners with diverse backgrounds, characteristics, and abilities.

C. identify and use technology resources that affirm diversity.

D. promote safe and healthy use of technology resources.

E. facilitate equitable access to technology resources for all students.

Students). (II, III)

48. design, implement, and assess learner-centered lessons that are based on the current best practices on teaching and learning with technology and that engage, motivate, and encourage self-directed student learning. (II, III IV, V)
49. guide collaborative learning activities in which students use technology resources to solve authentic problems in the subject area(s). (III)
50. develop and use criteria for ongoing assessment of technology-based student products and the processes used to create those products. (IV)
51. design an evaluation plan that applies multiple measures and flexible assessment strategies to determine students' technology proficiency and content area learning. (IV)
52. use multiple measures to analyze instructional practices that employ technology to improve planning, instruction, and management. (II, III, IV)
53. apply technology productivity tools and resources to collect, analyze, and interpret data and to report results to parents and student. (III, IV)
54. select and apply suitable productivity tools to complete educational and professional tasks. (II, III, V)
55. model safe and responsible use of technology and develop classroom procedures to implement school and district technology acceptable use policies and data security plans. (V, VI)
56. participate in online professional collaboration with peers and experts as a part of a personally designed plan, based on self-assessment, for professional growth in technology. (V)

*Adapted from the ISTE's National Educational Technology Standards for Students.

Actions and Recommendations

Actions by the Arkansas Department of Education

- Conduct a statewide assessment of classroom practices and gauge progress towards integration
- Facilitate and provide access to professional development activities, including distance learning
- Provide professional development in integration of technology into the Arkansas Curriculum Frameworks
- Provide training in data examination and analysis through technology to support sound decision-making
- Incorporate standards for technology proficiencies into educator renewal requirements
- Investigate leveraging the purchase of software to support technology professional development

Actions by Arkansas Education Service Cooperatives

- Offer professional development programs for educators on technology integration into teaching and learning, instructional management, and administration
- Offer professional development to educators in basic technology competencies
- Offer professional development to educators on technology integration into the Arkansas Curriculum Frameworks
- Offer professional development to educators through distance learning, distributed learning, on-site training and other means
- Design and implement staff development for local personnel responsible for technical support

Recommendations to Local Education Agencies

- Allocate at least 20 percent of technology budget for professional development
- Provide opportunities, incentives, and support for educators to develop model practices using technology
- Provide professional development on integrating technology into teaching and learning, instructional management, and administration
- Integrate planning for technology into all classroom, building, and district planning efforts (including Arkansas Consolidated School Improvement Plan)
- Track teachers' professional growth and development along a continuum of clearly identified technology skills and competencies
- Make available "just-in-time" professional development for educators
- Offer professional development to educators in basic technology competencies
- Provide faculty and staff with opportunities for professional development during the school day as well as other times
- Offer in-service workshops at varying knowledge and skill levels
- Provide on-site mentoring

INFRASTRUCTURE

Goal: *To have an intelligent Wide Area Network (WAN) that provides Local Area Network (LAN) access for K-12 instructional, curricular, and administrative programming from diverse remote resources over an interoperable platform to provide for a resource rich learning environment for any-age learners, anytime, anywhere.*

Schools meeting this goal will demonstrate the following:

- Course content resources that include information available through the world-wide-web, multimedia enhanced course software, and from remote interactive sources
- Integrated with and stimulated by business, government, and community partnerships
- LAN connectivity that permits transfer of unit level student and fiscal data from the classroom to the building administrative level, and then to the district central office
- WAN connectivity that permits transfer of unit level student, personnel, and fiscal data from the district central office to the department of education
- Connectivity to all schools within the community, district and/or buildings on the campus
- Sharing of information within the district by allowing access to servers at various instructional and administrative sites in the district
- Properly planned and installed network, that conforms to technical standards established by appropriate standards bodies
- Adequate technical support at the local level

State agency meeting this goal will demonstrate the following:

- All schools will be connected to the state's high-speed telecommunications backbone system, which integrate the school, community, and home through information networks
- Open system that accommodates voice, audio, video, and data using Internet protocol
- A comprehensive Distance Education Network that will enable learners to be able to reach beyond the limits of geography and time to expand opportunities for learning and make the educational process more interactive
- Adequate technical support

Introduction

The impact of technology upon our society, coupled with the rapid evolution of an interdependent global economy and environment, mandates fundamental change in our educational system. Because technology is permeating all aspects of society, there is an immediate challenge to provide our students with the opportunity and expectation to develop relevant, performance-based skills necessary not just to survive but to thrive in an information and technology driven era. The assembly line approach to curriculum, teaching, and learning cannot continue if students are to learn the skills necessary for the future. The paradigm of time as the constant and learning as the variable must change to learning as the constant and time as the variable—learning independent of time, pace, and place. Educational goals must integrate innovative ways of enabling students to access and apply 21st Century information. Instructional strategies must accommodate learning centered around the student as active participant and teacher as coach, manager, and facilitator of student-centered activities. Schools must be integrated with and stimulated by business, government, and community

partnerships. Curriculum must extend beyond the core content to include real-time, real-world project and problem-solving experiences that incorporate a diversity of disciplines. Therefore, course content resources must include information available through the world-wide-web, multimedia enhanced course software, and from interactive sources.

The extent to which the realization of the magnitude of this change drives a diffusion of technology into educational reform efforts in public schools will determine whether public education maintains the status quo or assumes leadership for educational innovation. Technology alone will not improve student learning. However, as a tool, it is capable of the enhancing the educational process by dramatically changing the traditional learning environment. Learners in the 21st Century will routinely access synchronous and asynchronous information and communication resources for education and training. As wire and wireless network technologies expand, equitable and comprehensive access to information resources will make the boundaries between school, work, and home more permeable and more interdependent. When schools incorporate various educational technologies into instructional programs in K-12 and link those technologies to student achievement, students will, regardless of age, be more likely to acquire the skills required to cope with problems and establish appropriate living and working environments.

There are enormous potential benefits for rapidly deploying telecommunications technology in Arkansas. The state of Arkansas must be positioned to connect to the emerging national and international infrastructure. Economic development via high-speed telecommunications will affect business, government, and education. The re-engineering of government services will integrate the community and home through community access information networks connected to the state's backbone network.

The purpose of this document is to describe district level educational applications and supporting LAN infrastructure that interfaces with a WAN telecommunications infrastructure that assures adequate and equitable access to electronic information resources and instructional delivery systems for all Arkansas students. This description assumes the concomitant development and implementation of a comprehensive state telecommunications infrastructure plan that incorporates educational infrastructure needs with government, medicine, and other public and private entities. It is also assumed that appropriate policies and best practices will be initiated that recognize the educational and economic opportunities afforded through comprehensive access to information resources and expanded relationships.

The desired end is to have an intelligent WAN that provides LAN access for K-12 instructional, curricular, and administrative programming from diverse remote resources over an interoperable platform to provide for a resource rich learning environment for any-age learners, anytime, anywhere. Virtual connected network facilities will make it possible to share quality instruction, to form diverse communities of learners, and to access curriculum and professional development from a variety of protocols equitably across the state.

The recommended network architecture is an open system that will accommodate voice, audio, video, and data using Internet protocol (IP). Integrating voice services over IP will allow educational entities to redirect fiscal resources previously spent for separate PBX voice systems toward other priority items. The focus should be on developing an intelligent network and thereby decreasing network end-point user costs.

Description LAN/WAN Educational Applications

Administrative

Education related administrative applications include a system for centralized collection of district, school, and individual data items. Administrative applications will place higher demands on the IP network as the need for higher reliability and availability of the network will be demanded. Such applications will not consume as much bandwidth as compared with many of the other applications, but because the financial and student records applications are mission critical to the daily operation of the school districts, the traffic assumes a higher priority over other applications. Because of the transactional nature of the network administrative traffic, it requires relatively low bandwidth and low

latency at the LAN level. These database transactions should originate from a user-friendly, windows-based GUI and be allocated forward from a10mb LAN through a 45mb and 155mb WAN. Since current IP networks generally are not capable of differentiating types and kinds of network traffic, it is not possible to prioritize network traffic and establish a guaranteed level of service for this application. Therefore, it is currently a fact that this mission critical application must compete with all other applications for network bandwidth.

Fiscal

LAN connectivity at the school district level will permit transfer of fiscal data from building level to the central administrative office; WAN connectivity permits transfer of data from the district central office to the department of education. WAN infrastructure will also permit regional data storage and retrieval if such capacity is desired.

Student/Personnel Records

LAN connectivity at the school district level will permit transfer of unit level student data from the classroom to the building administrative level to the district central office. WAN connectivity will permit transfer of student and personnel data from the district central office to the department of education. WAN infrastructure will also permit regional data storage and retrieval if such capacity is desired.

Information/Communications Resource

In addition to the administrative applications, it is anticipated that the communications and instructional applications made possible through the statewide infrastructure will become the dominant network traffic. Since the internet is expected to be the carrier for voice, video, and data communications in the future, it is critically important that public school students and faculty have equitable access to the world-wide-web that will be the gateway to educational resources and to electronic mail and listservs that will facilitate communication.

Instructional

A comprehensive Distance Education Network will be a cornerstone for the state's efforts to promote effective use of technology for lifelong learning and will help Arkansas as a largely rural state to equalize access to educational opportunities. Through the use of voice, video, and data services, learners will be able to reach beyond the limits of geography and time to expand opportunities for learning and make the educational process more interactive.

Distance Learning

According to the United States Distance Learning Association (USDLA) distance learning is defined as "The acquisition of knowledge and skills through mediated information and instruction, encompassing all technologies and other forms of learning at a distance." According to the Arkansas Department of Education, Distance Learning is "the technology and educational process used to provide instruction when the student and primary instructor are not physically present at the same time or place." These definitions include applications such as point-to-point and point-to-multipoint video-conferencing—both broadcast and interactive—for teacher sharing and professional development, web based instruction—both live and time-shifted—for curriculum provision and for curriculum enhancement. Technologies used to provide and support distance learning applications include

- interactive video—H.320, H.323, MPEG2,
- streaming video—real video H.225,
- satellite—analog and digital,
- audio-graphics for IP data and voice,
- world wide web—TCP/IP data, and
- broadcast video—multicast terrestrial MPEG2, analog and digital television.

Interactive Video

Expansion of the emerging distance learning initiatives involving both H.320, H.323, and MPEG2 video for instruction, training, and teleconferencing could predictably be the dominant consumer of bandwidth. The desired end is to have a network with interoperable hardware and a single software network management program. Consequently, a partitioned statewide network would be a desirable goal. However, in the development process to achieve that end while capitalizing on existing infrastructure and networks, it will be necessary:

- To integrate existing network platforms, and
- To add interactive classrooms that are compatible with existing infrastructure
- To maximize delivery of older technologies, such as satellite, over the emerging network.

An interoperable network will mean that both narrowband and broadband standards based systems will be available based on customer quality of service and cost considerations.

Desk-Top Video-Conferencing

It is anticipated that internet based video conferencing with IP based video technologies such as H.323 desktop video conferencing with MS NetMeeting and H.225 streaming audio and video like Real Video will become the "de facto" method of distributing one-to-one and one-to-many communications.

Streaming media will have a huge impact on education. Streaming media can leverage the ubiquitous reach of the Internet to provide rich media communications capabilities, both live, and time-shifted, providing a powerful resource for students and teachers. It can be expected that video will become the fastest growing traffic segment of our IP based Intranet and Internet network. Therefore, it is critical that both LAN and WAN infrastructure provide the connectivity and bandwidth capacity for all classrooms.

Broadcast/Video-on-Demand

As the cost of digital video servers and bandwidth continue to drop, video-on-demand services are becoming feasible. As video producers and broadcasters move into the Digital Television (DTV) era, production and distribution of video will be natively digital. Eventually, given enough end-to-end bandwidth, video-on-demand becomes essentially a storage and retrieval application. The digital revolution has begun to blur the lines of technologies that once were considered dissimilar. Voice traffic, once considered the realm of circuit switched networks, and video that could only be transported via satellite and conventional broadcast methods begin to look just like data. Broadcasters now deliver high quality video over terrestrial digital networks and data is being distributed in real time as part of DTV broadcasts. Commercial broadcasters are required by FCC mandate to broadcast DTV signals by 2002. AETN is mandated to do so by 2003. All broadcasts will be 100% DTV simulcast by 2005. DTV will provide a challenge for educators to integrate this commercial and residential based technology into education.

Web-Based

Applications like web based instruction that integrate technologies like WWW, streaming video, and desktop videoconferencing will directly impact the statewide IP network and backbone infrastructure as well as the state connections to the Internet. It will also increase the need for additional multipoint controllers, protocol translating gateways and scheduling.

Description of LAN Components

The Local Area Network (LAN) provides the connectivity among computers and other peripherals at the local level. The LAN allows computers to communicate with each other and with other networks throughout the world. Throughout this document, a LAN refers comprehensively to connectivity within one building, connectivity of a group of buildings on a campus, or connectivity of multiple campuses within a district. Proper architecture of the LAN is crucial to the successful use of technology in the classroom.

District Wide LAN

Each district should implement a district wide LAN to connect schools within the district. This connectivity will support communications within school districts and will provide access to remote regional and statewide resources as well as to the Internet. Because each school district has unique needs, a LAN for each district must be designed to meet the needs of that district. The district LAN will support sharing of information within the district by allowing access to servers at the various instructional and administrative sites. It also provides remote support for users, server maintenance, software downloads, and other support related functions.

For multi-site districts, a router can be used to link schools. Routers operate at OSI Network Layer (Level Three) and can support particular Network Layer Protocols, such as TCP/IP. Most network routers support multiple protocols as necessary to support the devices attached to the LAN. They also support various protocols such as Frame Relay and ATM for WAN connectivity.

Data Service Units (DSUs) are data transmission equipment that repeat and strengthen the signal from the network and provide the standard interface from telco to customer. DSUs convert the user's datastream to the appropriate signal for transmission over the LAN. A Channel Service Unit (CSU) is usually contained functionally within the DSU device. Routers convert the LAN data to a data circuit, such as a 1.544mbps (T-1) circuit. DSUs must be matched with the line speed of the circuit to which they are to be connected.

NOTE: It is recommended that the demarcation point between district LANs and the statewide WAN be at the router that connects to the WAN; in other words, DIS would be responsible for equipment and circuits down to and including the router. Districts would be responsible for other LAN routers and components listed below.

Workstations

Personal Computers (PCs) which are used by students, teachers, and other staff are referred to as workstations on the LAN. Specifications for workstations may vary based on user requirements. For example, students who are engaged in internet research may require different workstations than students using high-end software applications, or administrative staff using applications such as word-processing and student record keeping systems.

Servers

Servers generally provide added functionality for workstations on the LAN, such as holding software for workstation applications, data which is shared by users, and secure data belonging to individual users. They may provide other features such as print services, directory services, and security functions. They may also support communications functions such as email and web server capabilities. Adequate memory and disk space should be installed to delay the need to upgrade in the future.

Web Servers

Web server technology is relatively easy to implement and should be used by both the school and district staffs as well as by students and teachers. While searching the world- wide-web is a way for students to obtain resources from around the world, schools should also use the web as a way to post their own information. The web server should serve as a location for school/district information that is made available to the community as well as to the world-wide-web.

E-mail Servers

Districts should provide LAN based and dial-up e-mail access for staff. DIS serves as the Internet Service Provider through regional Internet nodes. E-mail software can frequently be installed on servers used for other purposes, such as file servers or web servers. Districts may choose to implement groupware applications which include functionality such as calendar coordination and document management in addition to e-mail.

Video Servers

Districts will need to add video servers to their networks if they incorporate video streaming and H.323 capacities.

Network Operating System

The network operating system is the software that runs on the server to provide file and print services, access control, and various other capabilities that support the users of the network. Novell and Microsoft NT are the dominant network operating systems. Unix can serve as either a server operating system or as the basis for a Web and/or email server. Linux is another emerging network operating system solution. It is preferable to pick one solution and apply it network wide.

Uninterruptible Power Supply (UPS)

Servers should be protected from power outages by connecting them to an UPS. This will provide power in the event of a loss of power. Most network operating systems will sense the loss of commercial power and will shut down the server if it is not restored quickly. This shutdown will prevent the loss or corruption of data. A UPS should also be used with critical workstations that might lose data if power is lost and could also be used for key network components such as routers, hubs, and other electrically powered devices.

Backup System

Each server should have a backup system that provides for the regular (daily) backups of the software and the data on the server with off-site storage.

Cabling

Wiring necessary to support communications within the building is a long-term investment. If properly planned and installed, it will support the long-term data, voice, and video needs of a school. All network components and design factors should conform to technical standards established by appropriate standards bodies where applicable. Very specific standards, such as the EIA/TIA 568A standards, are available to describe cabling and installation. These standards not only support the communications requirements but also take into consideration other things such as building code and fire protection requirements.

Unshielded twisted pair (UTP) will meet most needs for cabling to workstations and other devices. Category 5 (Cat 5) describes the current preferred minimum cabling installation. Fiber optic cable may be required for connections that exceed the limits of UTP. While most LANs have been installed using Ethernet 10base-T, which is a shared medium technology, the cabling system supports a migration path toward higher performance networking. For example, the Ethernet hub can be replaced with an Ethernet switch, and the 10-megabit Ethernet can be upgraded to 100 megabit Ethernet. Each of these upgrades will improve performance at a relatively low cost. Future upgrades to ATM in the WAN as well as in some LANs will provide higher speed bandwidth and will support future applications such as voice and video.

Description of Agency/Industry Relationships for WAN Educational Applications

ADE

Currently the role of the Arkansas Department of Education with regard to WAN applications has been specific to the administrative data network in a partnership with the Department of Information

Systems. ADE is essentially responsible for developing, managing, and monitoring the administrative software applications.

DIS

The statewide backbone will provide the high capacity "superhighway" that state agencies will share. DIS is responsible for the statewide backbone, an infrastructure that facilitates equitable access to remote resources, provides network firewall security, redundancy, and application specific bandwidth. DIS coordination of hardware, equipment, and circuits to schools for data applications is relatively mature.

The current LAN/ WAN interface was described previously; however, it is expected that the interface will become more software than hardware dependent with guaranteed paths to certain applications. DIS gateway will become customer specific. LEA responsibility will be for user level hardware and software upgrade. In that environment and as public schools are allowed to participate in vBNS(internet II), DIS should be responsible for setting network security standards with schools responsible for local security implementation.

DIS will be challenged to provide an interoperable statewide network capable of integrating diverse technologies for data, voice, and video applications. Such a network will necessitate a gateway function for accessing and integrating diverse remote programming and with a centralized scheduling capacity. It will likely be desirable to provide regional hubs that will facilitate the decentralization of services such as Internet access and of administrative and maintenance functions. Appendix II (a) depicts the current state of the Arkansas network. Appendix II (b) depicts the future state of Arkansas network plan. This Sonet/ATM based plan recognizes that quality of service is the central issue. All routes shown are OC3 (155mb) with looping for redundant access and with distribution of internet access regionally, which will help protect the integrity of APSCN data services.

Summary

This report is part of a long-range planning process whereby the state of Arkansas will outline processes, procedures, and policies by which Arkansas state agencies—to include educators and students—will have universal access to the national information highway and a statewide integrated digital wire and wireless backbone network for data, voice, and video communications, and information storage and retrieval. Increasingly, business, education, and government activities will revolve around national, state, and local community access information networks and customized information gateways. Collectively, these will provide a cost-effective telecommunications infrastructure that will be the avenue by which educators and students of all ages can have access to a variety of information and program resources that will ultimately enhance 21st Century economic development for Arkansas.

FUNDING

Goal: *Adequate funding will be provided to assure that all public school students and personnel will have access to and develop proficiency in the use of technology in the teaching/learning process.*

Schools meeting this goal will demonstrate the following:

- Technology initiatives/plans identified by the school improvement plan are budgeted and adequately funded
- Multiple funding options for technology initiatives are evident (example: e-rate, capital improvement, state/federal grants, local millage dedicated to technology, etc.)
- A minimum of 20% of the technology expenditure is dedicated to professional development
- The budget provides for continual assessment and up-grading of equipment

State agency meeting this goal will demonstrate the following:

- Adequate funding is provided for all students to have equitable access to technology resources
- Adequate funding for the state's data information network and infrastructure
- Provide resources for schools to implement "best practices" technology initiatives

Funding Guidelines

Funding as applied to the Arkansas Department of Education (ADE) Information and Technology Section is viewed as having three components: 1) funding for the functions and services offered by the ADE to the schools and education cooperatives of the state; 2) funding to carry out recommendations that are advanced by the State Board of Education, the legislature and the Governor that require the use of technologies in order to implement specific goals and outcomes; and 3) guidelines for processes and procedures to be used in effectively spending state, local, and federal funds provided specifically for technology use in schools.

The first level of funding is considered an internal matter for the ADE. The second level of funding can be generally addressed based upon other state models and unique characteristics of the programs being advanced. The guidelines, processes, and procedure aspects of funding are addressed in terms of best practice issues with practical considerations for any entity spending such funds.

High priority technology-based programs that are to be implemented statewide include those related to wire and wireless infrastructure information access, various types of distance learning, elementary and advanced multimedia applications, adaptive technologies for special-needs students, computer-managed interactive supplementary instruction, enhanced teacher productivity, tool applications related to problem solving, library automation, administrative computing, school-wide networks, and staff development.

The estimated cost for a national educational technology program based on existing state technology plans in several states has been developed by the United States Office of Education in 1999. The cost was estimated at 37 billion dollars of additional new monies over a period of five years for all K-12 public school students. That estimate suggests that the per student expenditure in Arkansas for implementing a state educational technology program is likely to be $165 each school year per

student. Therefore, using 450,000 as the K-12 average daily attendance in Arkansas, the estimated annual cost is $74,250,000. Three funding sources and the assignment of monies are as follows:

State
$44,550,000 (60%)

Local
22,275,000 (30%)

Federal and Private
7,250,000 (10%)

These figures are consistent with cost estimates that have been developed by other states. Therefore, $100 per student per year in new state monies designated for technology in K-12 education can be used as a basis for approximately a state/(local + federal) ratio of 2/1. The above estimates do not include monies for current programs being implemented and supported by the Arkansas Public School Computer Network, State Libraries, Higher Education, AETN, and Education Service Cooperatives, foundations or private business.

Capital improvement funds, E-rate funds, federal funds, dedicating local school millage to technology, and redistributing certain existing funds are strategies that have already been used by Arkansas school districts for funding plans for technology programs. It is recommended that the legislature use the following guidelines to arrive at the amount of funds to be committed to technology programs in K-12 schools. The guidelines are designed to help assure effectively used resources and take into consideration the fact that limited funding must meet a broad range of needs in schools.

- School districts should have written three to five year technology plans that identify program priorities and the local funds to be committed to program development and support.
- Monies allocated to districts should be distributed by formulas that assure a full measure of safeguards relative to equity.
- Programs developed in districts using state funds should address educational needs specified in school improvement plans, and expenditures should be audited to assure that funds have been spent appropriately.
- State funds should be used in the development and support of network infrastructures, teacher education programs related to technology applications, distance learning activities that replace traditional methods of delivering instruction, and program evaluation.
- There should be research, development, and evaluation funds used by the ADE Technology Section to help establish program priorities for the state and to evaluate those programs.
- The State should implement a process by which to secure educational software applications at significant discounts for schools. Consortiums of states should be formed to develop working relationships with education software companies in the context of services provided by such companies.
- ADE's Information and Technology Section should help prepare the schools for e-commerce as a primary means through which districts secure their technology products.
- Care must be taken not to penalize progressive school districts that have opted to invest local funding and efforts in educational technology including staff development and student programs. At the same time, consideration should also be given to districts that have not had the leadership or funds to move forward in this area.
- The efficiency of support services within and among districts and education cooperatives through operational standards and mutual cooperation utilizing technologies for communications is recommended.

- Maintain an awareness of savings that can be accrued through the Universal Service telecommunications discounts for schools and libraries, the anticipated continuing drop in the cost of various technologies, and large pooled statewide purchasing services including software contracts.
- Professional development of teachers in subject areas should include learning how to use technology to achieve instructional goals.

Major Benefits to be Accrued

The major benefits to be accrued from the leadership provided by the ADE Information and Technology Section and Educational Service Cooperatives depends upon the creative use of technologies in preschool, elementary, secondary, and higher education. These agencies are to help provide all learners with the knowledge, skills, and experience necessary to become productive workers, responsible and caring family members, and informed citizens.

Citizens of Arkansas must be educated to participate in an information-rich society. Therefore, it is essential that knowledge be based on learning to find and organize information, communicate thoughts and ideas, work independently, and collaborate with peers. Retrieving, manipulating, and storing information in a variety of forms involving numerous technologies is at the center of this type of learning. Technologies that accommodate such learning must become commonplace in classrooms and libraries.

The Educational Technology Plan anticipates the continuation of the implementation of a state telecommunications plan. The implementation of both plans is required if all citizens of our state are to be educated to participate in an information driven economy. Current leadership at the federal level suggests that special attention needs to be given to rural isolated school districts and the Delta.

There is recognition of a new paradigm for education. From their individualized classrooms, teachers and students will be able to send and receive faxes and electronic mail, upload and download information as easily as one opens and closes a file cabinet, access a variety of interactive multimedia programming and software, and communicate via audio and video with virtual communities of colleagues and peers and with those responsible for the health and welfare of students.

It is reasonable to believe that educational institutions attempting to articulate a vision of education in the 21st century must establish purpose and direction based on existing and emerging realities; otherwise, the result may be an obsolete perspective. Experience must be valued, but guided by a new view—a concept of teaching, learning, and doing that builds toward economic, social, and cultural advantages for our state. While being careful to temper future vision with present reality, educators must be vigorous in their affirmation of how schools must function as America enters the 21st century and participates in a global economy. As this technology plan impacts schools, libraries, and communities, Arkansas citizens should have equitable opportunity to access the information and develop the competencies to meet the challenges, cope with the problems, function effectively in living and working environments, and thereby foster a meaningful quality of life.

Resources

School districts can utilize the following sources to support existing programs and programs placed in priority categories for future implementation include the following:

- Federal Entitlements
- Federal Grants Disseminated by the State
- E-Rate Program
- State Grants, Requirements, and Application Process
- Foundation, Corporate, and Business Grants or Partnerships
- Capital Improvement Monies

- Local Millage Dedicated to Technology and Telecommunications Applications
- Regular District Funds
- Professional Development
- Curriculum
- Infrastructure
- Hardware and Software
- Support Services

Purchasing

Purchasing is the process of researching, comparing, and actually paying for equipment. When an item is purchased it is placed on the inventory, properly labeled and identified, and placed into service relative to a specific existing program or programs or a specific new program on the established priority list. The following purchasing guidelines are recommended for districts.

- Affected district personnel should understand the rules and regulations involved in purchasing.
- District procedures should be followed relative to taking bids and constraints observed that are placed on the district by state laws. Otherwise, established School Board and administrative purchasing procedures should be followed.
- Specifications for all items should be developed making sure that the items purchased have the characteristics and functionality that assure that the purposes for which such items will be dedicated can be achieved.
- All related cost should be considered for all items, their availability determined, and the need to purchase certain specific software and hardware that make the items functional in their applications
- Maintenance and repair costs should be anticipated as a result of the purchase including future cost once the warranty cycle has been completed.
- Certain programs including Work Force Education programs operate under a set of minimum guidelines set by the state. It is imperative that the guidelines be followed relative to the development of specifications for hardware and software.
- Purchasing becomes a highly specialized activity when the needs of special learners are considered. Technologies and software as well as workstation accommodations will require additional research and special attention especially related to:
  - Visual Impairments
  - Hearing/Speech Impairments
  - Learning Disabilities
  - Exceptional Students

Budget Development

Having set specific goals and objectives, identified equipment needs, and established a timeline, a district's budget should be developed to determine the estimated cost of the various aspects of the technology plan. The budget is linked to the district's goals, to student achievement, and encompasses all costs related to the technology aspects of the district's school improvement plan. A budget should be developed to span the same timeframe as the timeline used in the plan, preferably 3-5 years.

Budget Items:

- Staff Development
- Substitutes
- Program Visitations
- Special Courses and Workshops
- Equipment Costs
- Upgrade Costs

- Software Costs
- Set-up Costs
- Infrastructure Cost
- Facilities Modification
- Furniture and Workstations
- Internet Access Fees
- Service Contracts
- Maintenance Support Services
- In-house Technology Specialists/Consultants
- Insurance
- Program Supervision/Personnel Cost
- Phone lines, Security, Utilities, Expendable Materials

Recognizing that the school improvement process includes:

- Collecting, profiling, and analyzing data
- Selecting priorities and setting goals
- Benchmarking
- Designing Interventions
- Plan Implementation
- Monitoring and Evaluation

It is recommended that the budget for the programs included in the district's technology plan link to certain sections of the district's school improvement plan including, but not limited to, the intervention action planning section of the plan.

Cost Categories

Infrastructure

- Electrical
- Workstation Drops
- Retrofitting
- Backbone Network

Hardware and Software Support

Professional Development

- Instructional Applications
- Information Resources
- Planning

Software and Upgrades

- Instructional
- Administrative
- Network Management
- Library Research

Hardware/Networks/OS

- Upgrades (5-year life)

Network Operating Center

- Staff
- Work Area

Telecommunications on-line Cost

GLOSSARY

ACSIP: Arkansas Consolidated School Improvement Plan

Adaptive devices: Any piece of equipment that is used to increase, maintain, or improve functional capabilities of technology users.

ADE: Arkansas Department of Education

ADM: Average Daily Membership (referring to school enrollment statistics)

Advanced multimedia applications: Software applications that mix text, graphics, video, and audio.

Analog: A form of transmitting information characterized by continuously variable quantities, as opposed to digital transmission, which is characterized by discrete bits of information in numerical steps. An analog signal is responsive to changes in light, sound, heat and pressure.

Asynchronous Information: Data that can be transmitted intermittently rather than in a steady stream.

Asynchronous Transfer Mode (ATM): A cell based switching protocol that divides data streams into 53-byte cells, making it easy to mix data and video in the same system; protocol for local and wide-area networks.

Audio streaming: Sound that is played as it arrives.

Audio-Graphics: Real-time data conferencing combined with audio capability.

Backbone system: The cabling used to connect the telecommunications closets, cross-connects (main or intermediate), entrance facilities and equipment rooms, and the communications devices that make possible a high-speed network.

Bandwidth: The transmission capacity of a system.

Broadband: Refers to a network that carries information riding on carrier waves rather than directly as pulses.

Broadcast video: A packet delivery system where a copy of a given video packet is given to all hosts attached to the network.

Category 5 (Cat 5): An unshielded twisted pair wire that is used in order to transfer data. It allows the ability to run or upgrade to the faster network technologies that will require it.

Channel Service Units (CSUs): Usually contained functionally within the DSU device.

Collaborative tools: Any tools that link together people in several locations so that they can interact with one another.

Competencies: Having requisite or adequate ability or qualities.

Data Service Units (DSUs): Data transmission equipment that repeats and strengthens the signal from the network and provides the standard interface from telecommunications provider to the customer.

Demarcation point: The point where communications facilities owned by one organization interface with that of another organization.

Digital: Conversion of information into bits of data for transmission through wire, fiber optic cable, satellite, or over air techniques. Method allows simultaneous transmission of voice, data or video.

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Digital video servers: Any computer that allows other computers to connect to it allowing the exchange of video.

Distance resources: Anything conducted primarily through the utilization of distance learning technology (ex. satellite, broadcast, audio-graphics, web based, interactive video, and compressed video).

Download information: To call for and receive any form of digital data (e.g., text, graphics, video, sound) from some outside source (e.g., electronic bulletin board, network service), usually via a modem. Data transmitted in the opposite direction is said to be "uploaded".

EIA/TIA 568A Standards: An EIA standard for telecommunications wiring in a commercial or public building.

Email: Electronic mail received or sent via computer either locally on the LAN or through telecommunications.

End-point user: The ultimate user of a machine or product.

E-rate: Created as part of the Telecommunications Act of 1996 it ensures that all eligible schools and libraries in the United States have affordable access to modern telecommunications and information services. It is a federally managed program that provides significant discounts on telecommunications technologies to schools and libraries.

Ethernet: A form of local area network that implements the IEEE 802.3 standard. Computers, printer, and other devices on an Ethernet may be attached using a common transmission facility, such as a coaxial or twisted pair cable.

Ethernet 10base-T: IEEE's specifications for running Ethernet over unshielded twisted-pair cabling (Category 3, 4, or 5).

Ethernet hub: A device that all lines on an Ethernet segment are plugged into.

Ethernet switch: An Ethernet network that runs through a high-speed switch.

Fiber optic cable: A cable in which to transfer information through optical fibers in the form of light.

Frame Relay: An industry standard, switched data link level protocol that handles multiple virtual circuits between connecting systems.

Gateway: A computer that links dissimilar networks and allows information to cross between the two.

GroupWare applications: A class of software that helps groups of colleagues (workgroups) attached to a local-area network, organize their activities.

GUI: A graphical (rather than purely textual) user interface to a computer.

H.225: Call signaling protocols and media stream packetization for packet based multimedia communication systems.

H.320: An ITU standard for videoconferencing over digital lines. Using the H.261 compression method, it allows H.320-compliant videoconferencing room and desktop systems to communicate with each other over ISDN, switched digital and leased lines.

H.323: An ITU standard for videoconferencing over packet-switched networks such as local area networks (LANs) and the Internet. It allows any combination of voice, video and data to be transported. H.323 specifies several video codecs, including H.261 and H.263, and audio codecs, including G.711 and G.723.1.

Hardware: The computer itself as well as the components used to acquire, store and communicate data.

Hubs: A central connecting device in a network that joins communications lines together in a star configuration.

Input devices: A peripheral device that generates input for the computer such as a keyboard, scanner, mouse or digitizer tablet.

Intelligent network: A telephone network architecture originated by Bell Communications Research in which the service logic for a call is located separately from the switching facilities, allowing services to be added or changed without having to redesign switching equipment.

Intelligent WAN: A Wide Access Network that contains built-in diagnostics, management, fault tolerance and other capabilities that keep it running smoothly.

Interactive video: Allows for two-way communication between users, most often as real-time communication.

Internet: A world-wide system of networks that serves as an information conduit for the transfer of messages and files and is based on a set of protocol standards for communication and data exchange.

Internet Filtering System: A system that has the ability to block the viewing of undesirable Internet content.

Internet protocol: A connectionless, best-effort packet switching protocol. It provides packet routing, fragmentation and re-assembly through the data link layer.

Internet Service Provider (ISP): A company that provides individuals and other companies access to the Internet and other related services such as web site building and hosting.

Interoperable platform: The ability for one platform to communicate or work with another.

LAN (local area network): A computer communications network used by a single entity (for example, a school) over a limited distance, which permits users to share information and resources.

Latency: An expression of how much time it takes for a packet of data to get from one designated point to another; the time required to locate the first bit or character in a storage location, expressed as access time minus word time.

Learning modalities: Various ways and methods we learn utilizing one of the primary forms of sensation, as vision or touch (auditory, visual, musical, etc.).

Life-long learning: Learning that lasts or continues through all or much of one's life.

Local Area Network (LAN): A communications network that is privately owned and covers a limited geographic area such as an office, a building or a group of buildings.

MBPS: Megabits per second.

Millage: The tax rate assessed in mills per dollar. One mill equals one-tenth of one percent (.001).

MPEG2: Designed for coding interlaced images at transmission rates above 4 million bits per second, used for digital TV broadcast and DVD.

Multimedia authoring: Constructing multimedia presentations.

Multimedia: More than one concurrent presentation medium (for example, on CD-ROM or a Web site); the mixing of text, graphics, video (pictures), and audio (sound) on a single computer.

Multimedia tools: A situation where more than one medium of communication is employed to delivery a message. In a multimedia presentation it may combine video, sound, graphics, still photography, animation, and text.

Multiple computer environment: A computer lab or classroom containing several computers.

Multipoint controllers: A device that connects multiple sites and stations for videoconferencing.

Narrowband: A transmission medium or channel with a single voice channel; with a carrier wave of a certain modulated frequency.

Network architecture: The character or style of a particular network design; a fundamental underlying design of a communications network.

Network Operating Systems: A computer operating system that is designed primarily to support workstations, PCs, and, in some instances, older terminals that are connected on a local area network (LAN).

Online resources: Computer-based telecommunications networks that allow users to access, retrieve, and communicate information; broadcast messages; send electronic mail; and participate in user forums.

OSI Network Layer (Level Three): The network layer establishes the route between the sending and receiving stations.

Output devices: Devices that show or store information. The most commonly used devices are printer, computer screens, and hard drives.

PBX voice systems: A PBX (private branch exchange) is a telephone system within an enterprise that switches calls between enterprise users on local lines while allowing all users to share a certain number of external phone lines. The main purpose of a PBX is to save the cost of requiring a line for each user to the telephone company's central office.

Peripherals: Any computer device that is not part of the essential computer (the processor, memory, and data paths) but is situated relatively close by.

Point-to-multipoint video-conferencing: A videoconference that allows contact from one location to multiple locations (from one to many).

Point-to-point video-conferencing: A videoconference that allows contact from one location to another location.

Practicum: A course of study designed especially for the preparation of teachers and clinicians that involves the supervised practical application of previously studied theory.

Productivity tools: Any type of software associated with computers and related technologies that can be used as tools for personal, professional, or classroom productivity.

Proficiency: The quality or state of being proficient that implies a thorough competence derived from training and practice.

Real video: Video in which all sites participate simultaneously.

Remote interactive resources: To receive informational resources via a two-way system of electronic communications; interacting to obtain data; for many years airline reservations have been handled by interactive computer systems.

Retrofitting: To install (new or modified parts or equipment) in something previously manufactured or constructed.

Rich technology resources: Resources/activities designed to extend, enhance, and connect core learning activities using technology.

Router: A device that connects networks of the same type, allowing equipment on one LAN to communicate with devices on another.

SIS (Statewide Information System): Implements the provisions of several Arkansas General Assembly enactments which mandate that the Arkansas Department of Education (ADE) make extensive use of information technology at the state and local levels to provide accurate and timely information to policy makers and to reduce the state reporting burden.

Software: The programs used to direct the operation of a computer, as well as documentation giving instructions on how to use them; a program or set of instructions that tells a computer how to accept and manipulate data in order to turn it into information.

Sonet/ATM: An intelligent system that provides advanced network management and a standard optical interface. It uses a self-healing ring architecture that is able to reroute traffic if a line goes down.

Streaming video: A sequence of "moving images" that are sent in compressed form over the Internet and displayed by the viewer as they arrive.

Support: A network of people who provide an individual group of users with technical support.

Synchronous information: Data communications that are transmitted in blocks of data at regular intervals using timing signals to synchronize the sending and receiving equipment.

T-1 line: A digital WAN leased-line service standard that is provided by a local telephone service provider. T-1 has a data rate of 1.544 MBPS.

Tape backup system: Using magnetic tape for storing duplicate copies of hard disk files.

TCP/IP (Transmission Control Protocol/Internet Protocol): A suite of protocols accepted as the standard for all Internet activity.

Technology(ies): The method (usually electronic or by telecommunications) used for providing the student with materials, instruction, assistance, or a way to interact with the teacher(s) and other students.

Technology resources: Provide knowledge, information, and support for hardware, software, networks, and staff development.

Terrestrial: Pertaining to, consisting of, or representing the earth as distinct from other planets.

Tools (technology): Something necessary to provide educators the resources for educating students.

Uninterruptible Power Supply (UPS): A device that allows your computer to keep running for a short time when the primary power source is lost. It also provides protection from power surges.

Universal Service Telecommunications Discounts: A discount to provide affordable access to modern telecommunications and information services through the use of the Universal Service Fund, popularly known as the "E-Rate."

Unshielded twisted pair (UTP): Low cost cable used in 10 Base T networks.

Upload information: To transmit information created or stored on one computer to another computer.

vBNS (Internet II) : (Very high-speed Backbone Network Service) A high-speed network backbone developed by the National Science Foundation (NSF) and MCI that interconnects several supercomputer centers at 622 Mbps (OC-12).

Video Streaming: Compressing a sequence of "moving images" to be sent over the Internet and displayed by the viewer as they arrive.

Virtual Communities: Communities that allow for the creation of realistic depictions of physical space. Users appear to move through and manipulate objects in this artificial environment.

Virtual connected network facilities: An interconnected group of networks that appear as one large network to the user.

WAN (Wide Area Network): A WAN is a computer communications network used by multiple entities (for example, the schools within a school district) at geographically separate locations (and over longer distances than a LAN), which permits users to share information and resources. A network that connects parts of an organization that are spread across a wide geographical area, such as a company with offices throughout the United States, a multi-campus university system, or statewide K-12 computer network. A communications network that covers a large geographic area and uses telephone lines, microwaves, satellites or a combination of communications channels.

Web server: A computer that provides World Wide Web services on the Internet. It includes the hardware, operating system, Web server software, TCP/IP protocols and the Web site content (Web pages).

Web tools: Tools that generate and display files in hypertext markup language format.

Wide Area Network (WAN): A network that connects parts of an organization that are spread across a wide geographical area, such as a company with offices throughout the United States, a multi-campus university system, or statewide K-12 computer network. A communications network that covers a large geographic area and uses telephone lines, microwaves, satellites or a combination of communications channels. A WAN is a computer communications network used by multiple entities (for example, the schools within a school district) at geographically separate locations (and over longer distances than a LAN), which permits users to share information and resources.

Wire network: Transmitting data between personal computers, servers and other network devices with the use of a physical cable or wire.

Wireless network: Connects devices that are in the same general area such as an office or business park, using one of three transmission techniques: light beams, radio waves, or carrier-connect radio.

Workstation: A general-purpose computer designed to be used by one person at a time and offering higher performance than normally found in a personal computer, especially with respect to graphics, processing power, and the ability to carry out several tasks at the same time.

World Wide Web (WWW): A system of extensively inter-linked hypertext documents; a branch of the Internet; an international, Internet-based network of hypertext documents, which are often called "home pages" or "web sites".

APPENDICES

STATE PLAN DEVELOPMENT TIMELINE

The following is a summary of the procedure developed to draft the revised plan.

August 1999

- Initial preparation for the Plan revision began. The outcomes included a working plan, time-line, suggested committee members for the Planning Team, and recommended components to include in the Educational Technology Plan.
- An budget for the development of the plan was established
- A final member list was confirmed.
- A Steering Committee was established to facilitate the process and provide technical assistance for the subcommittees.

September 1999

- Facilitators were selected for each subcommittee
- The Steering Committee assembled facilitators' material that provides guidelines and assistance in the planning process.
- The Steering Committee planned the logistics for the first meeting of the whole committee

Late September 1999

- Meeting of the entire committee

October – November 1999

- Sub-committees meet to develop their draft reports.
- Steering Committee members continue to provide support to facilitators and receive subcommittee status reports.

December 1999

- A meeting of the entire committee convenes. The main purpose of this meeting is for reviewing subcommittee reports, and allowing other committee members to provide feedback and reactions to the sub-committee reports.

January 2000

- Sub-committees meet to refine drafts.
- Sub-committees submit their final reports to the Steering Committee by January 31.

February 2000

- Steering Committee prepares the final draft of the plan based on the subcommittee reports.

March 2000

- A meeting of the entire committee convenes on Wednesday, March 15. A final draft of the plan will be presented.

April 2000

- Provide a draft version of the report to Director of Education and ADE administration for review.
- Provide a draft version for preliminary review to the State Board of Education.

June 2000

- The Arkansas Educational Technology Plan is submitted for approval to the State Board of Education.

COMMITTEE MEMBERSHIP

Jim Boardman	ADE/Information and Technology
Melanie Bradford	ADE/Grants and Technology Resources
Margaret Crank	ADE/Curriculum and Instruction
Karen Ghidotti	ADE/Public Relations and Special Projects
Danita Hyrkas	ADE/APSCN
Belinda Kittrell	ADE/Distance Learning
Drew Mashburn	ADE/Unit of Technology Planning
Anniece Strong	ADE/APSCN
Charles Watson	ADE/System Planning and Support
David Westmoreland	ADE/Math/School Improvement Planning Unit
Kevin Lewis	AETN
Henry Anderson	AR High School for Math and Science
Jim Burgett	AR River Ed. Co-op
Jeanne Huddle	AR River Ed. Co-op
Bill Beavers	Arch Ford Education Co-op.
Charles Cobb	Arkadelphia High School
Beverly Elliott	Arkansas Leadership Academy
Phyllis Simon	Conway Public Schools
Sandra Hardage	Dawson Ed. Co-op
Kay Baker	Department of Workforce Education
Rick Martin	DIS
Curt Norland	DIS
Brenda Graham	Gould Public Schools
Roy Rowe	Hot Springs Public Schools
Cecil McDermott	IMPAC
Sunnie Ruple	IMPAC
Lucy Neal	Little Rock School District
Tim Taylor	Marion School District
Debbie Minchew	McGehee Public Schools
Dianne Martin	Mountain Home Public Schools
Bruce Watson	NE AR Ed. Co-op
Leon McLean	Ozarks Unlimited Resources Cooperative
Lin Hatch	Pocahontas School District
Kay Bland	Pulaski County Schools
Clif Blassingame	Russellville School District
Stacie McLellan	SE AR Ed. Service Cooperative
Jack Mulkey	State Library
Bill Dempsey	Texarkana Public Schools
John Goswick	UCA
Doretta Griffin	Workforce Education

ARKANSAS DEPARTMENT OF EDUCATION: INFORMATION AND TECHNOLOGY SECTION

The Information and Technology Section is responsible for providing accurate, timely information and appropriate, viable technology in support of the functions of the Arkansas Department of Education. The section assists school districts and the Department in the development of various planning initiatives. This section is responsible for coordinating and implementing the statewide information and reporting system, and providing training and support to the Department of Education staff.

The Information and Technology Section is divided into six units: Information and Reporting, Distance Learning, Data Administration, Infrastructure and Technology Planning, Network and Desktop Support, and Grants and Technology Resources.

Information and Reporting Unit
The Information and Reporting Unit collects, analyzes, and disseminates demographic and statistical data about Arkansas' public schools and school districts. Data provided by this unit is available for use by schools, districts, parents, legislative groups, agencies, Department management and staff, the media, and the general public.

The Information and Reporting Unit is also responsible for the Arkansas School Information Site (AS-IS) website and Arcview Geographic Applications.

Distance Learning and Internet Applications Unit
The Distance Learning and Internet Applications Unit provides leadership and assistance in distance learning initiatives and programs to Arkansas Public Schools and the Department of Education. The Unit designs, develops, and integrates distance learning and Internet applications for the K-12 educational environment. They analyze methods and mediums for distance learning and Internet applications through advanced educational technology systems. They recommend methods and measures to evaluate distance learning and Internet applications instructional systems.

Data Administration Unit
The Data Administration Unit works to improve the licensure process and provide public access to current licensure information. In collaboration with the ADE staff, they maintain the Statewide Information System (SIS) to include appropriate data elements for program operations. The unit also provides appropriate and current data and information to Department staff and the public.

Infrastructure and Technology Planning Unit
The Infrastructure and Technology Planning Unit provides service, leadership, and assistance in technology planning related activities for the Arkansas Public Schools and the Department of Education. They help to lead and facilitate local school district technology teams in the development of comprehensive technology plans. They offer assistance in the planning process involved in implementing an effective school-wide network and developing infrastructure standards. The Unit is also dedicated to simplify the E-rate filing process for Arkansas Schools and Vendors. The Unit works to facilitate wider participation in the E-rate program by assisting districts in the preparation and submission of E-rate applications.

Network and Desktop Support Unit
The Network and Desktop Support Unit provides local area network and desktop support for the internal operations of the Arkansas Department of Education. This includes software and hardware support for all Desktop PC's, Laptops, and Server and all supporting network equipment.

Grants and Technology Unit
The Grants and Technology Unit acts as a liaison with the U.S. Department of Education. They provide resources and technical assistance to LEA's, and Education Service Cooperatives. The unit also disseminates information on grants and resources through the utilization of the Internet, newsletters, and presentations.

ARKANSAS EDUCATIONAL SERVICE COOPERATIVE TECHNOLOGY COORDINATORS

Educational Service Cooperative Technology Coordinators are specialists that promote the coordination of technology services to local school districts.

Individuals employed for the position of Technology Coordinator have the following training and experience:

- expertise in providing staff development in instructional technologies
- expertise in school district technology planning
- training in network operating systems and management information systems

Duties and Responsibilities

The Technology Coordinators:

- Provide staff development for the personnel of member schools.
- Assist member schools with determining technology needs and types of computer hardware and software necessary to meet those needs.
- Assist with technology system analysis and local network design.
- Provide member schools with information on technology standards and specifications.
- Develop and coordinate a Technology Training Center located at the ESC.
- Coordinate information with ADE, APSCN, IMPAC, and the Governor's Technology Task Force so that member schools will be informed on technological activity in the state.
- Work with the ADE to insure that the statewide computer network system is established and maintained.
- Assist with proposal development and bid analysis so that member schools will be better able to utilize available technology funds.
- Share responsibilities with other Technology Coordinators in other ESCs to assure an effective and efficient statewide network.
- Collaborate with the ADE to implement technology initiatives.
- Maintain, summarize, and provide records and research data as required by the ADE.

ARKANSAS PUBLIC SCHOOL COMPUTER NETWORK (APSCN)

APSCN is a division of the Arkansas Department of Education (ADE). APSCN's mission is to implement a statewide data communications network that will provide all Arkansas public school systems with electronic access to administrative computing services and remote instructional resources.

To accomplish this mission APSCN is:

- Implementing the Statewide data communications network to connect all Arkansas schools (buildings and district offices), cooperatives, and the Arkansas Department of Education.
- Providing administrative computing services to support schools, district offices, and educational cooperatives in processing their daily financial and student management records.
- Assisting districts in the Statewide Information System reporting to the Arkansas Department of Education.

INTERNET FILTERING

ADE and DIS have implemented an Internet Filtering System for the public schools of Arkansas. Currently, most Arkansas Public Schools are accessing the Internet through this centralized Internet filtering system, called N2H2 (Bess). The final decision of how or whether to use a filtering system will be made at the local school district level.

BACKGROUND: The Arkansas Department of Information Systems (DIS) and the Arkansas Department of Education (ADE) were alerted to the local School Board desires to have certain objectionable material filtered from the school Internet access. There was also pending Internet filtering legislation being debated in Congress, which would require the filtering of material having violent or pornographic content. Therefore, DIS and ADE began a system evaluation in November (1999) to prepare to meet the technology requirements that would be necessary for statewide implementation of such Internet filtering.

STATUS OF INTERNET FILTER: The evaluation of the Internet Filtering System N2H2 (Bess) was begun on November 8, 1999 and ran until January 1, 2000, in order to evaluate the system. At the current time the filtering provided by N2H2 (Bess) is low-level filtering, based on the experience and best practices of their implementation in other states and school districts. A new version will be implemented by June 2000, which will allow for more local control of filter options

DISTRICT OPTIONS:
School Districts have the following three options for utilizing the N2H2 filter:
1. Opt out completely from filter system;
2. Remain on filter, and opt out certain designated computer workstations from filter;
3. Remain on filter and obtain an override password in order to reach filtered sites.

E-RATE IMPLICATIONS: The filtering project between ADE and DIS began when it looked as if filtering would be required to receive E-rate funding, however, legislation mandating filtering did not pass. It is possible, however, that E-Rate funding could become contingent upon content filtering at some point in the future. At that point, if a school loses funding due to its choice not to participate in filtering, and it impacts DIS/APSCN financially, the school will have to make up the difference to remain connected to the Statewide Network.

SCHOOL DISTRICT CHOICES: Each school district will make the final decision on using Internet filtering and which of the three filtering options it chooses to implement. Districts request an option by having the district superintendent make a request to Wendy Brocato at Wendy.Brocato@mail.state.ar.us.

ACCESSIBILITY ISSUES AND POLICIES FOR THE VISUALLY-IMPAIRED

(AS PER ACT 1227 OF 1999)

The Department of Information Systems (DIS), and the Arkansas Department of Education (ADE) recommend that each school district reevaluate their local web page in terms of making sure they are accessible to the visually impaired students/staff or community members. The deadline for making web pages accessible to the visually impaired was set by the Legislature to coincide with the implementation of Act 1227of 1999 in the summer of 1999, and has thus already passed. Many school districts are not yet compliant with this Act, so DIS has offered a model set of guidelines for making online information accessible (http://www.dis.state.ar.us/WG/Arch/A_1227/webaccess.htm).

Act 1227 states that all state agency and state-assisted organizations must comply with this new bill. According to the Act's definition a "state-assisted organization" means a college, nonprofit organization, person, political subdivision, school system, or other entity supported in whole or in part by state funds.
Act 1227 is not intended to require changes in online content; the intent is to ensure that information and services available to online users with disabilities are effective and useful.

DIS and ADE are not responsible for enforcing or policing the accessibility of external web pages. Each district is responsible for ensuring compliance with Act 1227, and for the compliance of their own websites.

Districts should plan to meet minimum standards, as required by Act 1227. Please refer to the following URL to view the requirements set by Act 1227:
http://www.arkleg.state.ar.us/ftproot/acts/1999/htm/act1227.htm

A district policy, or a statement of compliance to Act 1227, will need to be submitted with the districts revised district technology plan to ADE (districts will be required to submit revised technology plans at a time soon to be announced). For assistance in developing this policy please refer to Accessibility Policy for Web Page Access site (DIS): http://www.dis.state.ar.us/WG/Arch/A_1227/webaccess.htm

An additional resource for assisting district personnel in striving to comply with Act 1227 is:
Accessibility Issues and Policies for the Visually-Impaired (as per Act 1227 of 1999):
http://www.dis.state.ar.us/WG/Arch/A_1227/1227-home.htm

STATUS REPORT ON TECHNOLOGY IN ARKANSAS K-12 SCHOOLS

(Based on Education Week's Technology Counts 99 – Report)

The Arkansas average is not enclosed in parentheses, the national average is within the parentheses.

Students per	Arkansas Average	(National Average)		
• Computer	5.6	(5.7)		
• Multimedia Computer	10.2	(9.8)	High Poverty	13.0 (11.3)
• Internet Connected Computer	12.1	(13.6)	High Poverty	15.9 (19.2)

Percentage of students in schools with computers in all classrooms

- grade 4 ..... 54 (84)
- grade 8 ..... 20 (47)

Percentage of students in schools with computer labs

- grade 4 ..... 80 (79)
- grade 8 ..... 82 (91)

Percentage of schools where at least 50% of teachers have school based e-mail addresses

65 (65)

Percentage of schools with Internet access

95 (90)

Percentage of schools with Internet access from one or more classrooms

66 (71)

Schools with Internet access – the percentage that connect through:

- T1 ..... 37 (49)
- Cable Modem 7 (7)
- 56 kb Line 33 (12)
- ISDN 3 (7)
- Individual Network Modem 17 (23)
- Other 4 (2)

Percentage of school computers connected to a LAN

37 (22)

Percentage of districts that formally keep track of:

- technology available in schools 91 (96)
- location of technology in schools 91 (95)
- how teachers use technology 43 (50)
- how students use technology 48 (55)
- how much training teachers receive 72 (70)

Percentage of districts that formally evaluate technology use in schools

- more than twice a year 21 (29)
- yearly 54 (51)
- less frequently than yearly 26 (17)
- never 0 (3)

Percentage of schools where the majority of teachers are at one of the following four technology-use skill levels:

- Beginner 58 (35)
- Intermediate 37 (46)
- Advanced 1 (7)
- Innovator/Instructor 0 (1)

Percentage of schools where at least 50% of teachers:

- use Internet for instruction ..... 49(54)
- use a computer daily for planning and/or teaching ... 50(69)

National Survey

Information provided by the Teaching, Learning and Computing study of teachers' use of computer technology. More than 4,000 teachers, technology coordinators, and school administrators participated in the study. Findings were released throughout 1999.
(Not specific to Arkansas)

Percentage of teachers with

Desktop computer available for professional use when needed 53

Percentage of teachers using computers on a weekly basis

- for some type of professional purpose 88
- to make handouts 66
- to record and calculate grades 50
- to write lesson plans/related materials 43
- access the Internet on a regular basis 28
- to correspond with parents 23
- to exchange computer files 39
- to use camcorders or digital cameras 31
- to post student work on the World Wide Web 19

Percentage of teachers with

- 8 or more computers in classroom 8
- 4-7 computers in classroom 11
- Computer labs available with high student/computer ratio 80

Source: Henry Becker www.crito.uci.edu/tlc/

COMPUTERS IN ARKANSAS PUBLIC SCHOOL DISTRICTS GRADES K-12

Total By Year and Student/Computer Ratio

Date	Total # of Computers	Enrollment	Ratio
Oct 1982	1,569	431,422	275.0
Oct 1983	5,012	427,077	85.2
Oct 1984	9,403	426,376	45.3
Oct 1985	11,701	426,848	36.5
Oct 1986	14,250	428,688	30.1
Oct 1987	18,331	432,192	23.6
Oct 1988	22,856	428,680	18.8
Oct 1989	28,703	427,368	14.9
Oct 1990	3l,951	429,727	13.4
Oct 1991	35,180	429,761	12.2
Oct 1992	38,780	433,592	11.2
Oct 1993	44,309	438,538	9.9
Oct 1994	48,148	443,023	9.2
Oct 1995	52,036	445,913	8.6
Oct 1996	59,953	451,798	7.5
Oct 1997	61,571	455,626	7.4
Oct 1998	66,033	454,822	6.9
*Oct 1999	80,058	451,848	5.6

Based upon Quality Education Data Survey
*Reflects Goals 2000 and Challenge Grants Funds for last two years

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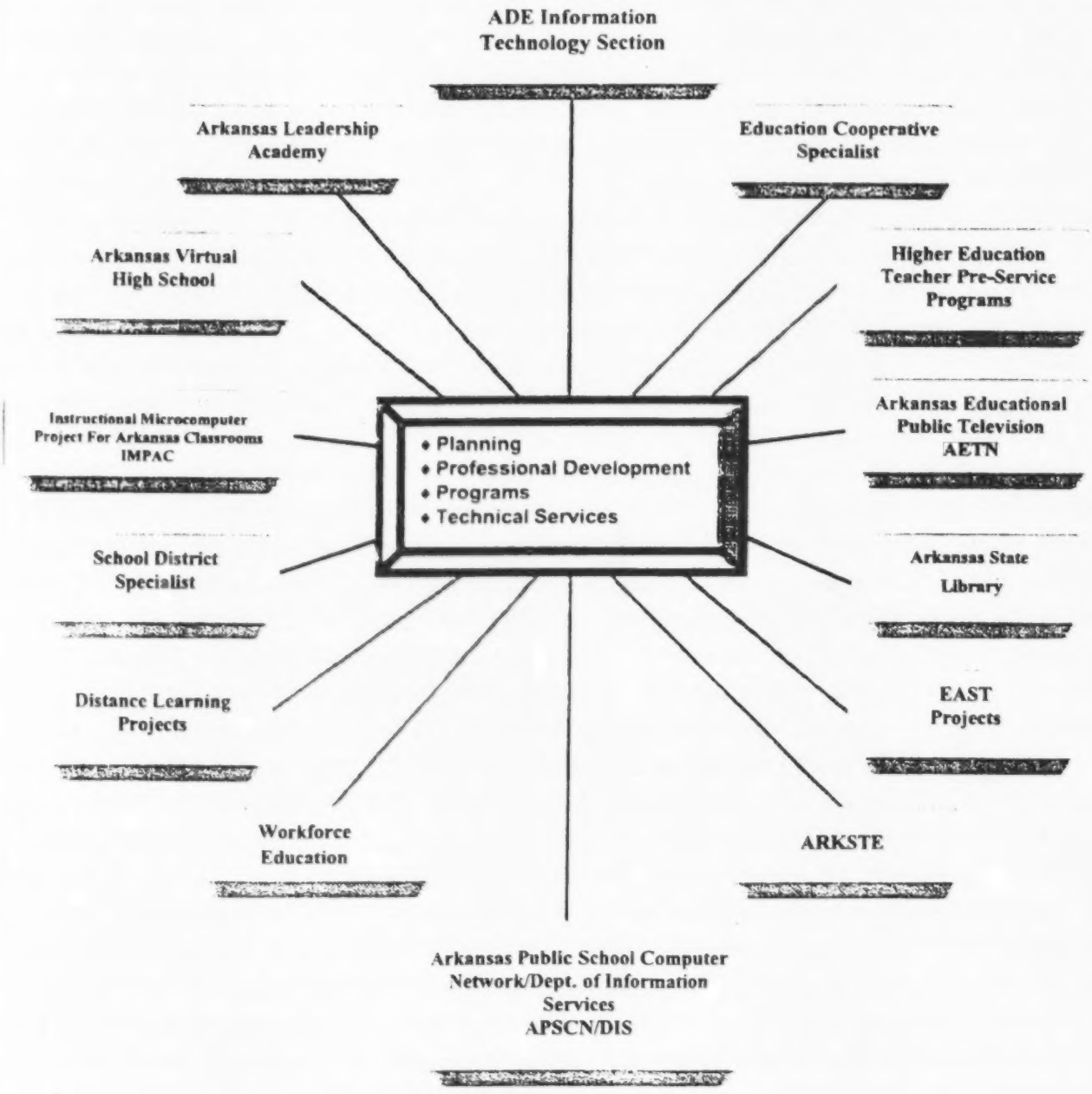
CONTRIBUTORS TO VARIOUS TECHNOLOGY RELATED EFFORTS



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Arkansas K-12 School Districts' *Electronic School District Technology Planning Guide*. The electronic report was developed under the guidance of the Arkansas School District Technology Planning Committee established by the Arkansas Department of Education. Available online at www.state.ar.us/demo/ade-guide.

Bielefeldt, T. (1995). *Systemic Planning for Technology*. Eugene, Oregon: Oregon School Study Council.

Consortium for Policy Research in Education (CPRE). Funded by U.S.D.E. Office of Educational Research. For information on CPRE publications contact Pat Michaels at CPRE, Carriage House of the Eagleton Institute of Politics, Rutgers University, 86 Clifton Avenue, New Brunswick, New Jersey 08901; (908)932-1331

International Society for Technology in Education Accreditation Committee. (1998) *Curriculum Guidelines for Accreditation of Educational Computing and Technology Program*. Eugene, Oregon: International Society for Technology in Education.

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Milken Exchange Publication on Education Technology (1999). Information Technology in Teacher Education: *A National survey on information Technology in Teacher Education*. Research Study by the International Society for Technology in Education.

National Council for Accreditation of Teacher Education, Task Force on Technology and Teacher Education. (1997). *Technology and the New Professional Teacher: Preparing for the 21st Century Classroom*. Washington D.C.: Author. (Also available online at http://www.ncate.org/projects/tech/tech.htm.)

Teaching, Learning and Computing: 1998. This site distributes research information from the national survey, *Teaching, Learning, and Computing--1998*, a study of teachers' use of computer technology, their pedagogies, and their school context.
http://www.crito.uci.edu/tlc/html/tlc_home.html

United States Distance Learning Association
PO Box 376
Watertown, MA 02471
Telephone: 800-275-5162
The United States Distance Learning Association is a nonprofit organization formed in 1987. The association's purpose is to promote the development and application of distance learning for education and training. The constituents we serve include Pre-K through grade 12 education, higher education, home school education, continuing education, corporate training, military and government training, and telemedicine.
www.usdla.org.

Resources for Training & Technical Assistance for Educators

Arkansas Dept of Education
4 Capitol Mall
Little Rock, AR 72201-1071
501-682-4475
http://arkedu.state.ar.us/educatio.htm

Arkansas Public Schools Web Pages
http://www.state.ar.us/education_p2.html

Arkansas Educational Television Network
350 South Donaghey
Conway, AR 72032, or
P.O. Box 1250
Conway, AR 72033
800-662-AETN (2386)
http://www.aetn.org/

Arkansas Public School Computer Network
101 East Capitol, Suite 101
Little Rock, AR 72201
501-682-4887
http://www.k12.ar.us/

Arkansas Educational Service Cooperatives
http://arkedu.state.ar.us/co-ops.htm

Arkansas Colleges/Universities/Vocational Centers
http://www.state.ar.us/education.html

Arkansas Leadership Academy
http://www.uark.edu:80/~alsa/

EvaluTech: A searchable database of instructional materials specifically designed for use in kindergarten through 12th grade. The database includes instructional software, educational Web sites, print and other material.
http://www.evalutech.sreb.org

Instructional Microcomputer Project for Arkansas Classroom (IMPAC)
3901 McCain Park Drive, Suite 113
North Little Rock, AR 72116
http://impac.k12.ar.us

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

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